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VIRGINIA MEDICAL MONTHLY

Official Publication of the Medical Society of Virginia

VOL. 69. January, 1942 NO. 1.

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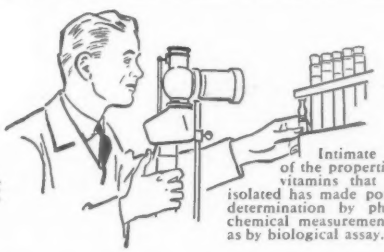

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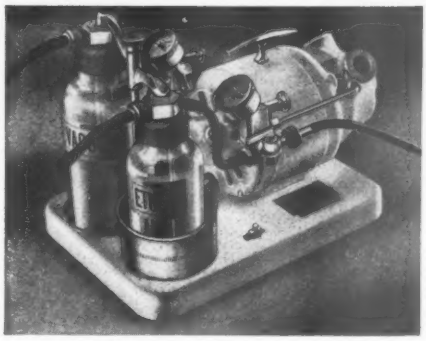

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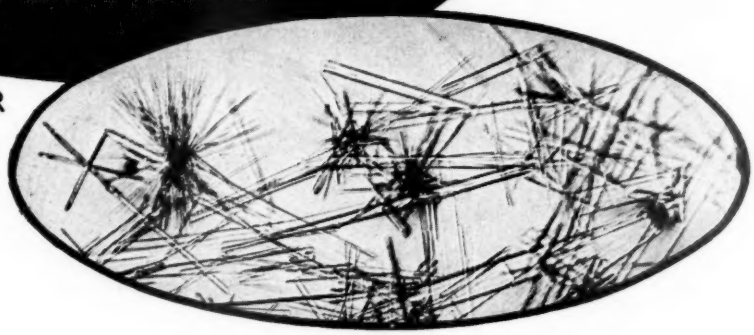

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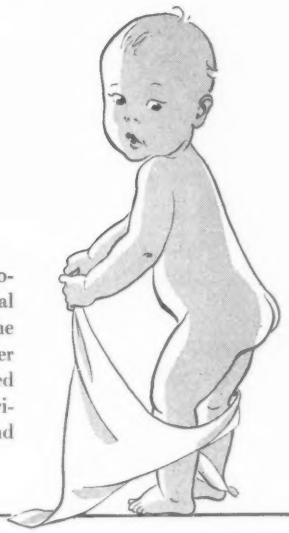

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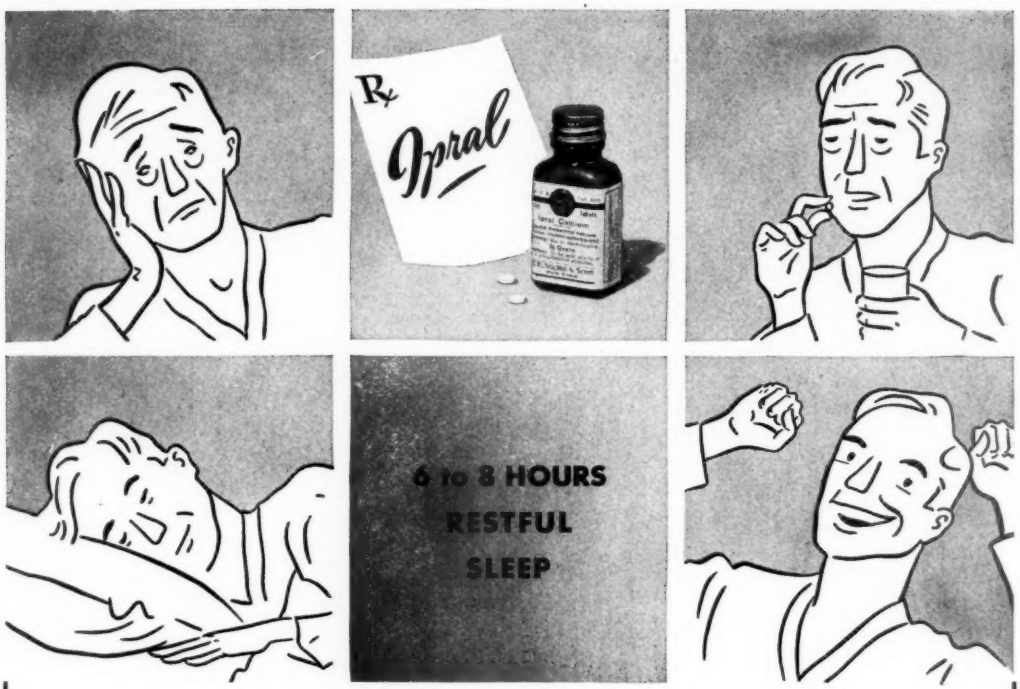

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Guest Editorial

Lipid Pneumonia

RECENTLY Cannon[1] has reviewed the literature on lipid pneumonia and Freiman, Engelberg and Merrit[2] have reported forty-seven cases from the Pathological Department of the Montefiore Hospital. During the fifteen years that have elapsed since Laughlen first drew attention to the condition, nearly two hundred cases have been recorded and the subject grows rapidly in interest and importance. Most of the cases have followed the use of liquid petrolatum, taken by mouth as a laxative, or through the nose and nasopharynx as an instillation or a spray. When we consider the large number of persons who daily use liquid petrolatum as a laxative or spray, and the almost universal habit of dropping oil into the nose of infants and children at the first evidence of the onset of a cold, the danger of these indiscriminate practices becomes almost alarming. Not only are they condoned by physicians but usually are advised by them. Therefore, it is essential that doctors understand the nature of the danger that is incurred and that they use reasonable care to minimize the danger.

Many observations have demonstrated that oil introduced into the nasopharynx of man or animals easily finds a way into the lungs. Small amounts of oil introduced occasionally do no harm unless there is disease of the lungs which prevents the oil from being discharged. Oil given by mouth may enter the lungs in large amounts when administered to debilitated, somnolent and comatose patients, to those with some nervous disorder which interferes with swallowing, and to infants. When oil reaches the lung, if it is irritating, a more or less severe inflammatory reaction occurs; to the bland oils there is little inflammatory reaction but always some edema and cellular infiltration of the alveolar walls. If the oil is retained within the lungs, the usual reaction to a foreign body begins and finally ends in extensive fibrosis. During the course of these reactions, frequently infection occurs to complicate the pathological changes and to modify the clinical manifestations.

As might be surmised the symptoms of lipid pneumonia are variable. In most cases the symptoms are mild and come on insidiously. Indeed, in many instances the disease is discovered unexpectedly in the course of a routine physical examination or in the roentgenogram. The evidence of extensive infiltrative disease of the lungs in the absence of pulmonary symptoms is a rather characteristic finding in lipid pneumonia. The clinical manifestations of the disease roughly may be grouped as follows: In most cases the patients have no symptoms and the condition is unsuspected until revealed at autopsy. In another large proportion of the cases the patients have no symptoms but routine physical examination or a roentgenogram reveals unexplained areas of consolidation in the lungs. A smaller number of cases have mild, vague symptoms, e. g., cough and a slight persisting fever, leading to an examination of the lungs which discloses one or more areas of consolidation usually of an extent not to have been anticipated from the mildness of the symptoms. There may be cases with recurring bouts of fever and evidence of areas of pulmonary consolidation resembling broncho-pneumonia. These symptoms are caused by recurring pulmonary infection. Or, there are cases with chronic cough, pain in the chest and often a little fever showing on examination massive consolidation of one or more lobes. The condition may simulate carcinoma as did the interesting case reported by Thomas and Rienhoff. The acute cases following the aspiration of a large amount of oil are easily recognized except perhaps in the unconscious or moribund patient. The clinical manifestations are those of aspiration pneumonia. Lipid pneumonia complicating another pulmonary disease may produce a puzzling clinical picture.

It seems altogether likely that most cases of lipid pneumonia are overlooked and that the disease will prove to be not an uncommon one when physicians become skilled in detecting it. Any unusual pulmonary lesion should arouse suspicion, particularly the demonstration of an unexpected lesion or of a lesion more extensive than the clinical symptoms had led one to anticipate, or a lesion of unusual form and distribution.

LOUIS HAMMAN.

1. Cannon, P. R., The Problem of Lipid Pneumonia. *J. A. M. A.*, 115, 2176, 1940.
2. Freiman, D. G., Engelberg, H., and Merrit, W. H. Oil Aspiration (Lipoid) Pneumonia in Adults. *Arch. Int. Med.*, 66, 11, 1940.

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PUBLIC HEALTH IN VIRGINIA

I. C. RIGGIN, M.D.,
Commissioner of Health,
Commonwealth of Virginia,
Richmond, Virginia.

Public health has for many years been considered a definite obligation of government in this Commonwealth. That the happiness, prosperity and progress of this State are dependent upon a healthy people has long been recognized. Today, however, because of the present tragic world situation, the discharge of this obligation of the State to its citizens assumes a more imperative role. If anything other than misfortune can be ascribed to the current world crisis, it may well be the full realization of the importance of this activity to the safety of our country and its institutions. America's and Virginia's first problem today is defense, and our ultimate defense lies in the strength of our man power. The physical fitness not only of our armed forces, but also of our workers in defense industries, and even the health of our civilian population, will determine in a large measure the effectiveness of our war efforts.

Virginia has ranked well in the Nation in regard to the services which she has provided for the prevention of disease, prolongation of life and the promotion of the well-being of her citizens. Remarkable progress in these endeavors can be exemplified by a few facts.

The years 1915 to 1940 have witnessed a decline in death rates from pulmonary tuberculosis from 157.9 per 100,000 population to 52.5 in 1940. This disease, which in 1915 ranked first among the deaths of our people, has through these years been reduced to seventh place.

The following table illustrates similar reduction in other communicable diseases.

	1915		1940	
	Deaths	Rates*	Deaths	Rates*
Typhoid and Paratyphoid	514	23.4	27	1.0
Diphtheria	374	17.0	51	1.9
Malaria	153	7.0	—	—
All Puerpeural Causes	469	7.8†	246	4.5†

In 1920, 81 of every 1,000 babies born to parents of this State died before they reached their first birthday. This represented a tragic toll of 5,500 infant deaths. In 1940 the rate was 59 per 1,000 babies born, an annual saving of over 1,200 lives in this age group. Other accomplishments during this twenty-year period may be read in the complete elimination of smallpox as a cause of death, a reduction in the mortality of typhoid fever to less than one-fifth, of diphtheria to less than one-third, and of the diarrheal diseases to less than one-half of their rates for 1920.

In the control of the communicable diseases, it is necessary that there be collection, tabulation, and analysis of data concerning their incidence and prevalence in order that information may be available as a basis for recommendations of measures for their prevention. Investigations are made of outbreaks and unusual prevalence of these diseases to determine the source of infection in order that control measures may be promptly instituted as a necessary adjunct to the program. A consulting diagnostic service in communicable diseases is available to all physicians of the State upon request.

There has been a reduction of approximately 40 per cent in both the number of cases and deaths from typhoid and paratyphoid fever over the totals for 1939. This is the seventh consecutive year in which a reduction in the number of cases and deaths from these diseases has been recorded and is a new low level in the history of the diseases.

A new low was established for the year 1940 in the reported cases of diphtheria and resulting deaths, there being only 709 cases and 51 deaths.

The 22,974 cases and 690 deaths attributed to influenza during 1940, because of the lack of a reliable diagnostic criterion and the variability in the reporting of these and similar illnesses, are of doubtful value for comparative or prognostic purposes. The presence of a respiratory disease in epidemic proportion, clinically resembling influenza and subsequently proven by laboratory study, along the west coast of the United States in December, indicated the likelihood that an epidemic in Virginia and other states would follow. The epidemic was experienced in this State in January and February, 1941, and will be reflected in the morbidity figures for that calendar year.

In October, 1940, the first intensive pneumonia

*Rates per 100,000 population.
†Rates per 100,000 live births.

control preventive measures were inaugurated and the preliminary reports of the first eight months' work in this field show a total of 248 cases of lobar pneumonia rendered aid through the treatment by drugs and sera furnished to medically indigent individuals. In addition, 90 cases of bronchial pneumonia received treatment. For 208 of these cases, 1,252 laboratory examinations were performed. The reported results show that 224 of these patients recovered and only 24 died, giving a case fatality rate of 9.7 per cent. Previous experience with this disease has shown an expected case fatality rate of at least 25 per cent. There is need for an expansion and further application of modern control measures if we are to reduce further the deaths occurring from this disease.

Although during the past year there has been no outbreak of poliomyelitis or of cerebrospinal fever in epidemic proportions in the State, there was an unusual prevalence of poliomyelitis in several areas in the southwestern part of Virginia, and there was a slight increase in the prevalence and mortality of cerebrospinal fever represented by 73 cases and 32 deaths. Any increase in these diseases is important as an indication of the probability of an increasing virulence of the diseases due to the change in environmental conditions conducive to the spread and severity of these infections. These conditions have developed as a result of the large scale activities incident to the national defense program. Overcrowding and poor hygienic surroundings particularly in regard to sleeping quarters are definite factors in the spread of cerebrospinal fever. The lack of adequate hospital facilities for the effective isolation and treatment of patients in most areas will likewise increase the difficulty of controlling these and other acute infectious diseases.

A specific program for the control of syphilis, gonorrhea and other venereal infections has been carried on in Virginia since 1936. The endeavors in this field include educational activities for the physicians and the public, the treatment of cases by private physicians and of medically indigent individuals in public clinics, the tracing of sources of the infection and the follow up of infected individuals. Legislation passed by the last session of the General Assembly requiring premarital serological examinations has been made an integral part of the general program.

There are at present within the State 118 clinics operating in cooperation with and receiving assistance from the State Department of Health for the treatment of persons infected with these diseases. Drugs were distributed in the year 1940-1941 in the amount of 775,483 doses, which would render adequate treatment to approximately 18,000 individuals.

It may be noted that 44,113, or 83 per cent, of the total examinations made as a result of the pre-marital examination law were on individuals under 30 years of age—the group to whom the knowledge of the presence or absence of infection is most important. Moreover, since it is generally accepted that 50 per cent of all new cases of syphilis occur in the age group 21 to 30, the examination of these individuals is particularly valuable in efforts to control the disease. Without this legislation, many of the 1,357 individuals found infected in this age group would never have been aware of their infection, and therefore, would not be under treatment. It is of interest, also, to note that the infection rate among females of child-bearing age is approximately the same as the rate determined for that group in previous prevalence studies made in Virginia.

With the tremendous influx of population the problems involved in venereal disease control have necessitated the placing of six epidemiologists in district headquarters throughout the State in areas where defense work is most active.

An indication of the work being undertaken to reduce the incidence of venereal disease is seen in the number of records being handled under the premarital examination law, totaling 52,000 statements by physicians and approximately 65,000 laboratory reports, and under the selective service act, the handling of 80,000 selectees' reports. In fact, over 200,000 records are being handled per annum in the control and prevention of venereal disease alone.

In Virginia, tuberculosis ranks seventh as a cause of death, and yet, a critical analysis reveals that it is first for men between the ages of 25 and 35 and for women between the ages of 15 and 35 years. The total mortality in 1940 for the white race was 732 and for the Negro, 828. One-fourth of the population of Virginia is Negro, and it is alarming to note that 96 more deaths occurred in this group than in the remaining population. Many factors contribute to the high death rate in the Negro race. Some are probably uncontrollable, but there should be provided a minimum of at least one bed per

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annual death. It is imperative that additional measures to control tuberculosis in the Negro race be put into effect immediately.

There are at present 770 beds for white patients and 265 beds for Negro patients at the State sanatoria. There are six tuberculosis sanatoria operated by municipalities providing a total bed capacity of 563. Through a State subsidy plan, 20 per cent of these beds are available to patients of the State irrespective of their place of residence. These institutional facilities for the care and treatment of tuberculosis should be increased. This increase should include facilities for the care of pulmonary tuberculosis, complicated by other diseases, tuberculosis of organs other than the lungs, and for patients in serious or advanced stages of tuberculosis. Also, there is need for compulsory isolation of careless or uncooperative cases of open tuberculosis in institutions other than prisons. Improvements under way at the State Farm will minimize this need, but it will by no means meet it adequately. Isolation should be provided for certain classes of patients in institutions less elaborate and costly than the sanatoria. They should effect humane isolation with more nearly normal living conditions and provide adequate free bed capacity.

The collapse therapy has developed to such an extent that it equals in importance the other major activities essential for the control of infection. Clinics or stations are established throughout the State, none being further distant than thirty miles from any patient where pneumothorax can be performed on suitable patients. During the past year, 666 patients were given approximately 24,000 treatments with no fatalities or untoward results.

The success of the mobile x-ray unit as a consultation service for general practitioners throughout rural areas of Virginia is indicated by the fact that there is a total of approximately 12,000 examinations made each year at the request of physicians. The necessity for these units is indicated by the fact that an average of between 500 and 600 patients per annum are recommended for sanatorium care.

A study of tuberculosis in pregnancy begun in 1938 carried on through the medium of x-ray examinations of 235 unselected patients attending prenatal clinics has emphasized the problem associated with the proper care of pregnant women who have tuberculosis. In this group, 29 cases of tuberculosis were found; 11, or 4.6 per cent, were in the active stages of the disease. This figure (4.6 per cent) is the highest tuberculosis rate of active cases found in any random group in the State. This study has shown that the incidence of tuberculosis in pregnancy is greater than has been realized. It is hoped as a result of this study that facilities will be made available to care for the women having tuberculosis during pregnancy and at time of delivery, and for as long a period afterwards as may be indicated.

The general welfare of our people is intimately concerned with the health of the mothers and children. Special programs have been developed in Virginia to promote their well-being and to prevent untimely death. These activities include all the usual media of public health education and special clinics to provide diagnostic and advisory service for mothers and children. This work is well developed in those counties of the State in which full-time local health departments operate. This type of service to be at all effective requires full-time health personnel for its administration and for this reason it is not yet available to all areas of the State. The establishment of local health departments in the areas now without this service is fundamental to the further extension of the maternal and child health program. There is an additional need for hospital facilities to provide safe management of complicated cases upon the recommendation of the patient's physician.

The licensing and supervision of maternity hospitals, delegated to the State Department of Health by the General Assembly of 1940 upon recommendations of the State Medical Society, should effect a more efficient hospital service for mothers and infants.

Activities concerning the health of the school child should be pursued more intensively. A more extensive and comprehensive program in cooperation with the State and local boards of education would be both desirable and productive.

Of the clinics maintained there are 142 Maternal and Child Health clinics in operation. The local practicing physicians participating in these clinics have performed excellent service. Indigent mothers and children made 81,810 visits to these clinics during the past year. Each clinic has been a practical demonstration to each local community of the advantages of adequate medical supervision for all classes of mothers and children.

Group instruction in maternal and infant care

was further developed and extended by public health nurses in connection with their work in the maternal and child health clinics. The investigation and study of each maternal death in the State, started in December, 1939, in cooperation with the medical profession, has been continued. There is definite evidence that obstetrical patients are receiving better care because of this study. Increased knowledge of the factors involved in preventable maternal deaths has made possible a more scientific approach in efforts to secure a still greater reduction of these deaths.

Practically one-fourth of all infant deaths in Virginia for the past ten years have been ascribed to prematurity. Facilities for the care of premature infants have been poorly developed, or entirely lacking in the great majority of even the larger hospitals throughout the State. Only a very limited number of hospitals have installed incubators for premature infants. A satisfactory and inexpensive incubator, the result of the construction of numerous models and several years of effort, was developed by the State Department of Health. The construction of fifteen of the Virginia incubators was planned, but only two were finally obtained due to inability to obtain materials on account of the defense program. A plan has been worked out whereby the State Department of Health incubator is to be made available on a loan basis, as soon as materials for construction can be obtained, to those hospitals developing the specialized nursing service. With the incubator loan proposition as an added attraction, it was possible to develop specialized training in the care of premature infants as a post-graduate course for nurses. Since an incubator is only a useful accessory in the proper nursing care of premature infants, the development of specialized nursing services for prematures in the hospitals of the State has been emphasized.

A model premature station and nurse-training center was established in a hospital at a central point. Intensive training in the nursing care of premature infants was offered to selected graduate nurses from various hospitals throughout the State. Eight representative hospitals each had a nurse receive the benefit of the two months' post-graduate course.

Through the Crippled Children's Bureau, an attempt is being made to locate and register all crippled children. At present there are 6,907 crippled children on the registry of the State Department of Health. The diagnosis and treatment of the medically indigent children who are crippled as a result of previous existing diseases and conditions are provided through orthopedic clinics. Aside from humane considerations, this endeavor, through the rehabilitation or minimizing of the crippling of many unfortunate children contributes in a large measure to the general well-being and health of the people, and in many instances will make the cripple an asset to his community rather than a liability.

Orthopedic clinics are held throughout the State for the purpose of making diagnosis and advising as to treatment and hospitalization. There is a need to increase orthopedic hospital facilities in order that surgical treatment may be rendered for certain types of indigent crippled children not now included in the service.

Children suffering from recent attacks of poliomyelitis are seen through an orthopedic consultant service in order that they may be placed under corrective treatment at the earliest possible moment and thus minimize the crippling after-effects.

For some time it has been believed that the incidence of rheumatic fever was comparatively high in the State of Virginia. Therefore, a study of this disease was started to determine its prevalence among children. Diagnostic services, hospitalization, convalescent care and complete follow up of indigent children suffering from rheumatic fever or heart disease was established. To date this program has been confined to the city of Richmond and adjacent counties. Of the 979 children examined, 56 revealed heart conditions suggestive of rheumatic heart disease. Thirty-six patients have been hospitalized during the most acute stages of their illness. Convalescent units of eight beds have been set up for the white children at the Crippled Children's Hospital and for Negro children at the Richmond Community Hospital.

The medical and dental profession are fully cognizant of the importance of mouth hygiene in the preservation of the health of the people. Virginia's program of mouth hygiene was inaugurated and sponsored by the dental profession of this State. The principal objective of the program is an educational one, actual dental operations being used to demonstrate the relationship and value of mouth hygiene to the general health of the individual. The cooperation of the county school boards by provid-

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ing financial assistance to help defray the cost for indigent children has been of assistance in the maintenance of this program. Twenty dentists are employed to conduct clinics on this cooperative basis, in twenty-four counties for white children and in nine counties for Negro children throughout the State. As a result of these clinics, approximately 60,000 children are offered the opportunity of obtaining dental care each year.

Public health has recently been expanded in Virginia to include a new phase of health activity, namely, Industrial Hygiene. This new activity, confined to adults, is chiefly concerned with the health problems of the working population. The Virginia Manufacturers Association, the State Chamber of Commerce, and other groups manifest interest in the services of this bureau. The growth of the industrial life of Virginia during recent years and its rapid expansion due to the defense program made it essential that work in this field be augmented. Every means available should be used to conserve our industrial man power. Occupational and environmental conditions detrimental to health prevent maximum efficiency in the performance of work.

It is well established that many of the preventable diseases are more prevalent among the industrial population than among any other population group, some of these diseases being tuberculosis, pneumonia, venereal diseases, silicosis and many of the so-called common respiratory diseases.

In connection with the medical service maintained in Industrial Hygiene, a mobile x-ray unit using the new 35 mm. film for chest plates has been made available to industry. Under ideal conditions, over 500 films may be taken daily, and approximately 35,000 x-rays of industrial workers may be taken per annum.

The public health laboratories represent a most important adjunct to all but a few of the individual endeavors of a balanced health service. Public health laboratories are located in Richmond, Norton, Abingdon and Luray. These laboratories make bacteriologic and serologic tests without charges on specimens submitted by physicians of the State. These services are essential as an aid in the diagnosis of communicable diseases. In addition, bacteriological examination of water and milk samples and other specimens are made to determine their sanitary quality and safety.

The importance of environmental sanitation in the prevention of disease and the promotion of health has always been recognized by the State Department of Health and has been incorporated as an integral part of its general plan for the promotion of the health of the people. General supervision and control of the public water works and supplies as far as the sanitary and physical quality of the water affects public health, falls in the field of Sanitary Engineering. There is available to municipalities, institutions and individuals, technical assistance and advisory service in regard to sewerage systems, and disposal of sewage and industrial wastes.

In the protection of the health of the people, the supervision and control of the growing and marketing of shellfish is an essential service of the State Department of Health. The inauguration and supervision of a program for the control and elimination of the pest mosquito and other duties relative to engineering problems affecting the public have been developed as a part of the services now being rendered.

The subject of nutrition is receiving national attention as a defense measure. To stress the principles of nutrition and proper diet to the general public, Virginia is taking advantage of every opportunity to see that her citizens receive all available information concerning the right foods for vitality and health. A State-wide Nutrition Committee has been organized, as have local committees, all these volunteer agencies working in close cooperation with the State Department of Health. Through these committees, nutrition classes have been and are being formed to disseminate knowledge concerning the value of foods and the importance of diet to health.

However much has been and is being accomplished, the scope of the work is limited for it is only through the establishment and maintenance of full-time local health departments in every governmental jurisdiction of Virginia that the most efficient public health service can be rendered. The success achieved in the preservation of health and in the control and prevention of diseases is fundamentally based upon local health services. Experience has shown that the handicaps in the operation of clinical services are so great that the operation of these services is not justified unless administered as a part of the local health department. Forty-eight of the 100 counties in Virginia are served by local health departments. These local health agencies

operate in full cooperation with the State Department of Health as a definite branch of the respective local governing bodies. The administration and supervision of the full-time cooperative county health departments is the responsibility of the Bureau of Rural Health. The bureau aids in the development of the public health program in each local area, and renders technical advice and aid in matters of public health administration.

Fifty-two counties containing approximately one-third of the rural and semi-rural population of Virginia are without health facilities provided by local departments. Perhaps the outstanding health need at the present time in Virginia is the establishment of county or district health departments to serve the people of these areas.

All of the cities of the first class and a number of smaller cities and towns maintain their own health departments. These vary as to the adequacy of their personnel, facilities and programs. There is need of advisory service to facilitate standardization and coordination of the programs of the municipal health departments. Closer cooperation should be effected between the State Department of Health, including the county health departments, and the municipal health departments.

Coincident with the need for additional local health departments and for standardization of local health practices is the advisability of revision or modification of certain local health regulations, and in some instances of State-wide regulations to insure uniform and effective procedures. This includes regulations governing the sanitary quality and safety of milk and other foods as well as the sanitation of the establishments in which they are served.

In many respects the public health of today is far in advance of the period of the last national emergency. What is more important, however, is that much remains to be accomplished. Slow and unsatisfactory progress in some endeavors must be remedied or more productive methods employed. New problems occasioned by the defense activities in many areas of the State must be met. The gains which have been made do not in any sense fully compensate for the present increased need for the protection of the health of our defense and civilian population. The problems of public health have increased many fold within the period of the national preparedness program. All of our health forces, both governmental and lay, must be mobilized, strengthened and coordinated.

THE MANAGEMENT OF CHRONIC SUPPURATIVE PULMONARY DISEASE*

PORTER P. VINSON, M.D.,
Medical College of Virginia,
Richmond, Virginia.

Every lesion encountered in the trachea, bronchi, or parenchyma of the lungs may be associated with suppuration, but this discussion will be limited to chronic pulmonary infection not associated with foreign body, syphilis, tuberculosis, malignant or benign growths, extra-bronchial tumors, or the various fungus infections that occasionally invade the tracheobronchial tree. There is already too much confusion in classification of pulmonary suppuration and in procedures recommended in treatment without discussing various specific diseases which may result in secondary suppurative processes.

When specific pulmonary disease is encountered, treatment should be directed toward the primary lesion; with its removal, the secondary suppurative process usually subsides spontaneously. This is best illustrated in removal of a foreign body from a bronchus, followed by resolution of the infected area in the lung even when the foreign body with accompanying suppuration has been present for a number of years.

The greatest difficulty in evaluating efficacy of various procedures which have been utilized in management of pulmonary suppuration has resulted from lack of satisfactory classification of inflammatory processes in the lung, producing purulent secretion. Although it is improbable that any classification of chronic, pulmonary, suppurative diseases will be acceptable to all physicians, the following grouping has proved valuable to me:

1. Diffuse suppurative pneumonitis.
2. Abscess.

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3. Bronchiectasis.
4. Partial inflammatory occlusion of a bronchus with intermittent retention of secretion.
5. Congenital or acquired cystic disease of the lung with infection.
6. Empyema with bronchial fistula.

CHRONIC, DIFFUSE, SUPPURATIVE PNEUMONITIS—As the name indicates, this is chronic diffuse infection in a lobe or portion of a lobe of a lung. If only part of a lobe is involved, the lesion is usually located in the posterior portion of one of the lower lobes. Symptoms may be similar and as severe as in abscess, but when infection is diffuse, indications for proper treatment may not be well defined. Sometimes stenosis of the bronchus communicating with the area of infection may be detectable, but at other times the bronchial lumen may appear normal in size.

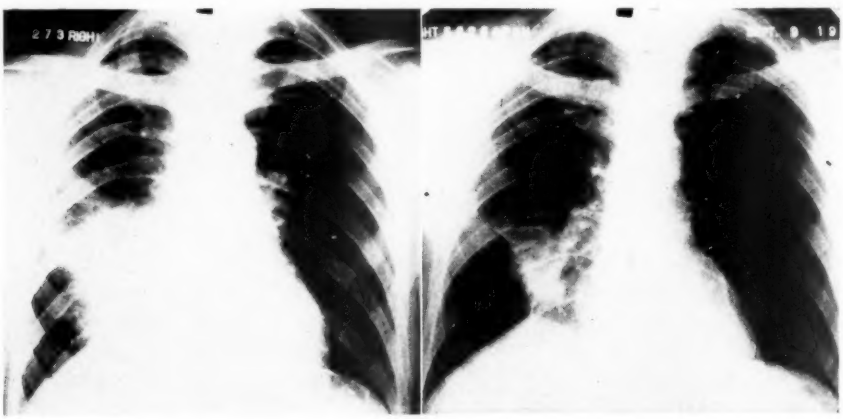

Fig. 1. A. Chronic, diffuse, suppurative pneumonitis following tonsillectomy under local anesthesia. B. Residual fibrosis in lung fourteen months after bronchoscopic drainage of area of suppuration; patient clinically well.

In any case, effort should be made to promote drainage by enlarging the bronchus with forceps introduced through a bronchoscope. A few treatments with Roentgen rays may also prove beneficial. Improvement may be slow, but as long as it is progressive, treatment should be conservative (Fig. 1). External surgical drainage is not satisfactory, and excision of the infected area with cautery, or lobectomy are the only surgical procedures that can be expected to afford relief.

ABSCESS—Pulmonary abscess may result from aspiration of material into the tracheobronchial tree or it may begin as embolic infection from disease in another part of the body. This second type is frequently called metastatic abscess.

Aspiratory abscess is usually single and may involve any portion of either lung, but is seldom encountered in the middle lobe of the right lung. In the acute stage there may be an area of infiltration with a suggestion of central necrosis, which is determined by Roentgen examination. In this stage, administration of one of the chemotherapeutic agents may produce resolution of the area of infection. Development of chemotherapy may prove of increasing value in treating patients with chronic pulmonary suppuration. Difficulty in determining the causative organism makes treatment for these lesions unsatisfactory, and the fact that an organism obtained from the area of suppuration may grow in culture media is not sufficient to validate the assumption that it is the causative agent.

In the subacute and chronic stage when cavitation has occurred, treatment with drugs is seldom beneficial. Presence of Vincent's organisms in the sputum of many patients with pulmonary abscess has led to employment of arsphenamine and other arsenical preparations. I do not believe that these organisms are responsible for suppurative disease in the lungs or that arsenical drugs have any value in treatment of nonspecific pulmonary infection.

Aspiratory pulmonary abscess is usually associated with stenosis of a bronchus and probably begins as ulceration in that bronchus. An area of atelectasis follows, which soon becomes infected, and necrosis and emphysema produce cavitation. If the stricture in the bronchus can be identified and

dilated through a bronchoscope, recovery occurs in approximately 75 per cent of cases. Bronchoscopy is, therefore, the first operative procedure that should be employed in management of pulmonary abscess (Fig. 2).

term postural drainage is usually interpreted to mean that the patient should kneel on the edge of a bed or chair with his hands on the floor, thus inverting his thorax. This posture might facilitate drainage from an area of infection in the lower lobe of the

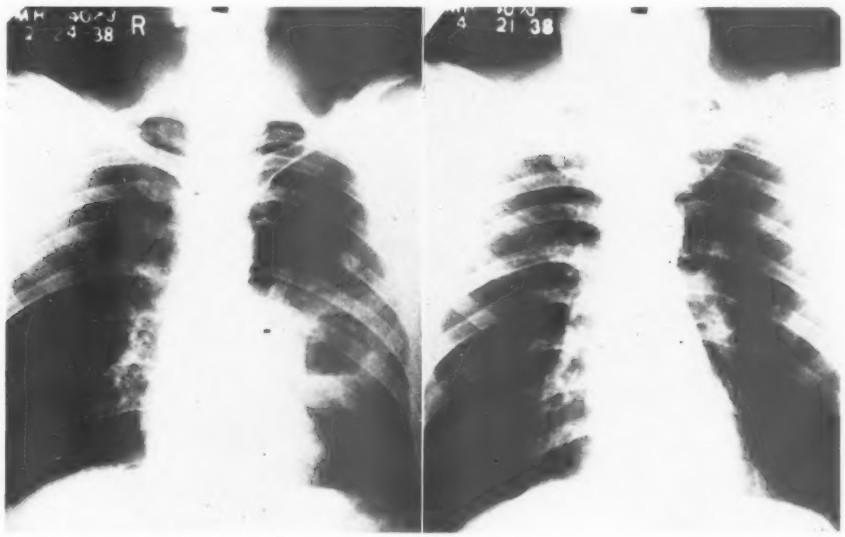

Fig. 2. A. Aspiratory pulmonary abscess, probably from dental infection; stricture identified in posterior division of left lower lobe bronchus at bronchoscopy.

B. Roentgenogram, same patient, two months later: complete recovery following dilatation of bronchial stricture and aspiration of abscess at bronchoscopy.

If adequate drainage is not obtained at the first bronchoscopic examination, treatment by this method should be repeated in a week or ten days. Should this not produce satisfactory improvement, a third attempt may be indicated. If the third treatment is not effectual, external surgical drainage should be provided without further delay. In abscess in an upper lobe of the lung, drainage through a bronchoscope may be more difficult than when the lesion is in a lower lobe. If, however, a proximally illuminated bronchoscope is used and the patient is cooperative, the bronchial stricture can usually be identified and dilated satisfactorily.

Drainage of abscess of the lung by postural methods is seldom effective, and when a patient is acutely ill, it is unwise to attempt this type of treatment. Unless the bronchial stricture has first been divulsed, drainage by posture cannot be accomplished. When an abscess is located in an upper lobe, it would seem illogical to place the patient in the same posture that is used when an abscess is located in the lower lobe of the lung. However, the lung if the bronchi were not obstructed, but it is difficult to imagine that it would be effective in promoting drainage from an abscess in an upper lobe even when the bronchial lumina are of normal size.

Pneumothorax should not be employed in any type of non-tuberculous pulmonary disease except as a preliminary measure in the removal of a portion or all of a lung. Compression of a lung that is infected by organisms other than bacilli of tuberculosis invites development of empyema, and if bronchial stricture is present, drainage is further impaired.

Embolic or metastatic pulmonary abscess may be single or multiple and may involve one or more lobes of the lungs. Treatment is identical with that suggested for aspiratory abscess, but the outcome is less favorable than in the abscess that has resulted from aspiration of material into the bronchi (Fig 3).

BRONCHIECTASIS—Many conditions of the tracheobronchial tree, associated with cough and expectoration of mucus or pus or evidence of bronchial infection, are referred to as bronchiectasis. Although

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bronchial dilatation may be present in most of the cases thus classified, severity of symptoms and response to therapy may vary markedly. Absolute classification of these lesions is not possible, but the following types are often observed:

(1) *Infection of the tracheobronchial tree associated with and secondary to infection in the nasal accessory sinuses*—In this condition cough and expectoration of mucoid or mucopurulent secretion are secondary to suppurative disease in the nasal accessory sinuses. Bronchoscopic examination reveals small amounts of mucogelatinous, non-odorous secretion throughout the tracheobronchial tree. Treatment of the primary source of infection is usually sufficient to relieve manifestation of disease in the lower air passages.

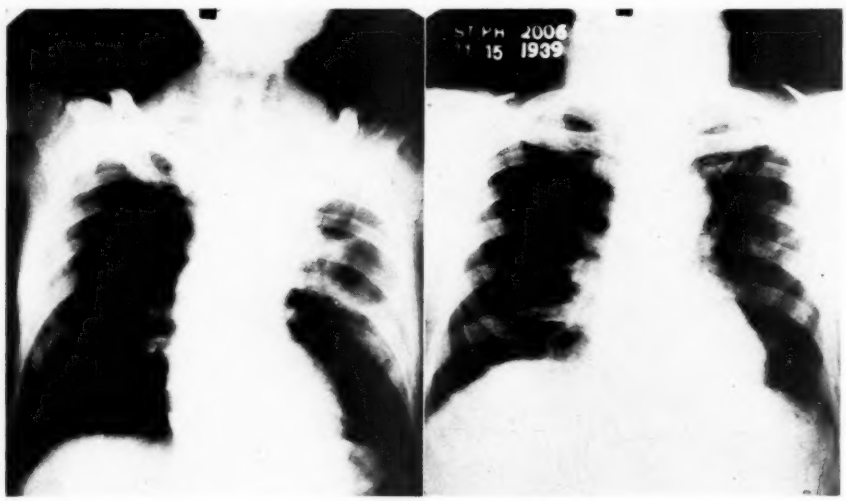

Fig. 3. A. Embolic pulmonary abscess following repair of inguinal hernia.

B. One month after bronchoscopic aspiration of abscess; no evidence of bronchial stricture at bronchoscopy.

(2) *Pulmonary fibrosis with purulent bronchitis*—Many patients who suffer from chronic asthmatic bronchitis, essential or secondary emphysema, or other types of respiratory disorder associated with pulmonary fibrosis may have varying degrees of purulent bronchitis. There may be episodes of fever, purulent sputum, and evidence of areas of bronchopneumonia. Although pulmonary fibrosis cannot be cured, occasional bronchoscopic aspiration of purulent secretion from the tracheobronchial tree followed by insufflation of 1 gram of powdered sulfanilamide into the bronchi may produce a beneficial effect. If the patient tends to have asthmatic manifestations, oral administration of iodides and belladonna may be helpful in relieving bronchial spasm. Postural drainage is seldom advisable because dyspnea is intensified by increased physical exertion incident to change in posture. I have not observed beneficial results following instillation of iodized oil into the bronchi in patients with chronic pulmonary suppuration, and when the process is associated with emphysema and fibrosis, symptoms are frequently aggravated by this type of treatment. Autogenous or stock vaccine has often been used in treatment of this and other varieties of bronchiectasis, but benefit has rarely been obtained.

(3) *Hemorrhagic bronchiectasis or bronchial erosion with hemorrhage*—This condition results from an area of granulation tissue in the depths of a small bronchus.[2] A little pus may be present in the bronchus, but the usual manifestation is bleeding from the lung in a patient who has been well prior to hemorrhage. If bronchoscopic examination is made at the time that bleeding is active, the hemorrhagic area can be identified, and curettement of the bronchial wall is followed by permanent cessation of hemorrhage. This lesion is comparable to erosion of the nasal septum with nose-bleed.

(4) *True idiopathic bronchiectasis*—The most common type of bronchiectasis usually begins in early life following whooping cough or some other acute respiratory infection. Symptoms may be mild

or severe, depending upon the extent of the lesion, the size of the sacculations in the lung, and the degree of retention and stagnation of secretion. In mild cases cough may be annoying, but the amount of sputum is small and easily evacuated, with no odor or taste. General nutrition of the patient is unimpaired. Physical and roentgenoscopic examinations rarely reveal significant changes, but bronchoscopic study discloses pus in the lower lobes of both lungs without narrowing of the bronchial lumina. The mucous membrane may be fairly normal in appearance. Bronchograms following instillation of iodized or other opaque oil usually demonstrate dilatation of bronchi, but considerable infection may be present in the bronchi, as revealed by direct inspection through a bronchoscope, without significant change in outline of the bronchial tree.

In severe cases there is evidence of absorption of pus, with pallor, clubbing of the fingers, and extensive change in the lungs on physical and roentgenoscopic examination. A large amount of malodorous, foul-tasting sputum is produced. This type of bronchiectasis is not associated with reduction in the size of the bronchi and almost always begins in the lower lobes of both lungs. As the disease progresses, it may involve the middle lobe and eventually the lower portion of the upper lobes, especially on the left side. Infection of the nasal accessory sinuses is frequently an accompanying condition, but treatment directed to the nose and sinuses does not influence the infection in the bronchi. Probably the infection in the sinuses is the result rather than the cause of the pulmonary disease.

When bronchiectasis of this type is diagnosed in children, surgical removal of the lower lobes of both lungs may be indicated. In adults, removal of the infected lobes is not quite so satisfactory because of the greater risk of operation. If, however, the disease is severe and more conservative measures have not afforded relief, excision of the diseased portions of the lungs should be recommended. Compression of the lungs by thoracoplasty or pneumothorax is inadvisable.

Postural drainage may be helpful in providing periods for evacuation of pus from the lungs, obviating the necessity of coughing incessantly throughout the day. When postural drainage is employed, the periods of drainage should be placed before meals and before retiring at night. If the procedure is attempted after meals, forced cough may induce vomiting. Drainage by posture should not be continued if bleeding is incited by increased physical effort. Sometimes inhalation of steam for ten or fifteen minutes before postural drainage promotes expectoration of secretion. When systematic, faithful drainage by posture is observed, there may be reduction in the amount, odor, and foul taste of the sputum, and the patient's general condition is improved.

Frequent bronchoscopic aspiration of secretion from the tracheobronchial tree, with or without irrigation of the areas of infection, has been recommended as producing beneficial results. Although all patients who suffer from chronic pulmonary disease of non-tuberculous origin should have at least one bronchoscopic examination, I have not been impressed favorably with the effect of bronchoscopic aspiration alone in treatment of chronic bronchiectasis. During the past three years I have obtained much more satisfactory results from bronchoscopic aspiration of pus from the tracheobronchial tree followed by insufflation of powdered sulfanilamide, and I believe this method of treatment should be given a trial in all cases of bronchiectasis.

PARTIAL INFLAMMATORY OCCLUSION OF A BRONCHUS WITH INTERMITTENT RETENTION OF SECRETION—The posterior division of the bronchus to the lower lobe of each lung is a common site of inflammatory disease. When inflammation is located on the left side, evidence of infiltration that might be disclosed by roentgenoscopic examination may be obscured by the heart shadow, and bronchoscopy may be the only method for detecting the site of the disease. When a patient has recurring episodes of fever followed by expectoration of pus, partial bronchial stenosis should be suspected. One of my patients had had periods of fever followed by cough and expectoration of pus at intervals of one week to six months for forty years before the exact character of the lesion was determined by bronchoscopic examination.[3] Prickman and Moersch[1] have reported a group of these patients with allergic and infectious asthma. Dilatation of the narrowed bronchus provides adequate drainage and results in relief of symptoms.

CONGENITAL OR ACQUIRED CYSTIC DISEASE OF THE LUNGS WITH INFECTION—During the past decade cystic disease of the lung has been recognized with increasing frequency. Whether the cysts are congenital or acquired may be problematic in many

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instances, but indications for treatment are the same in all patients. Infection of the cystic areas or repeated rupture of the cysts with pneumothorax are complications that may necessitate surgical intervention. It is possible that many patients who, seemingly, have bronchiectasis dating from early life may in reality have multiple small congenital cysts which have become infected. In such cases surgical excision of the involved portions of the lung may be required. When infection occurs in a solitary cyst, bronchoscopic drainage should be attempted before resorting to surgical drainage or excision.

EMPYEMA WITH BRONCHIAL FISTULA—When empyema occurs, delay in external drainage is often followed by rupture into a bronchus. After external drainage has been established and healing seems complete, symptoms may recur with fever and drainage of the area of infection through a bronchus. Several years may elapse between the original disease and its recurrence so that an independent process may be suspected. Bronchoscopic examination, with injection of radio-opaque oil into the bronchus from which pus is seen to exude, facilitates identification of the empyema cavity. External surgical drainage should then be instituted.

SUMMARY

1. A variety of suppurative processes may involve the tracheobronchial tree and must be differentiated before proper treatment can be administered.

2. A classification of chronic, suppurative, pulmonary processes is submitted.

3. Any patient with suppurative disease of the lung should have at least one bronchoscopic examination for accurate determination of the location and distribution of the area of infection.

4. When bronchial stricture is present, adequate drainage can often be provided by bronchoscopic methods with beneficial or curative result.

5. More accurate visualization of the small bronchial divisions can be accomplished by a proximally illuminated bronchoscope than by a distally illuminated one.

6. Bronchoscopic aspiration of the tracheobronchial tree followed by insufflation of powdered sulfanilamide has benefited patients with chronic bronchiectasis.

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DISCUSSION

DR. C. LYDON HARRELL, Norfolk: To me this is a most interesting subject. I think I have seen more than my share of suppurative disease of the lung. I would like to ask Dr. Vinson how he differentiates between aspiration abscess and embolic abscess.

I think that any patient with pulmonary abscess should be put absolutely to bed. It has been demonstrated that fifty per cent of them will recover spontaneously with just rest in bed. If spirochetes are present, arsenicals should be used; if other organisms are present, sulfanilamide or allied drugs should be used. I think every case of lung abscess should be given a reasonable chance to get well before other means are used. Bronchoscopy is very important, but I do not think it should be used alone.

A few years ago I reported a series of cases in which fifty per cent had been cured by artificial pneumothorax. If you can catch them in the beginning and put in just enough air to keep the lung from adhering and give them a chance to cough up the secretions, I think there is a good chance of healing. If adhesions have already formed, then pneumothorax is out of place. After the lung is adherent I think the open drainage is the proper thing to do.

In cases of bronchiectasis, surgery has been a little unfortunate in my hands. Of two that we operated upon, one died; the other was cured. I think lipiodol has its place in bronchiectasis. There are some few cases that are not amenable to surgery. Some do not want to be operated on, and some are not strong enough to be operated on. I believe lipiodol has its place. First, it is heavier than the sputum, and the sputum floats on top and can be coughed up. Second, it is soothing. Third, it seems to have some bactericidal effect.

DR. DEAN B. COLE, Richmond: Suppurative pulmonary disease is a very common condition in our experience. I wish to thank Dr. Vinson for his paper. We see a great many patients with this condition, and are convinced that no single treatment is suitable for all.

Regarding sinus disease, we find this a frequent and, I might say, usual complication of chronic suppurative pulmonary disease, especially bronchiectasis. Whether the sinuses or the chest is the primary source of infection becomes academic if the patient suffers from both conditions. In our experience it is desirable and often necessary to treat both conditions to obtain the best results.

Undoubtedly, allergy plays an important role in many of these patients, and infection may be either primary or

secondary. If and when allergy is present, this should be corrected when practical.

I doubt if empyema should ever be drained bronchoscopically. I also do not believe that every patient with bronchiectasis should be bronchoscoped, although, when indicated, bronchoscopy may be helpful. We also find chemotherapy useful in a fair number of these conditions.

Bronchiectasis may be thought of as a relapsing disease, but much can be done through proper treatment .

I am glad Dr. Vinson mentioned iodized oil. We find it helpful in both diagnosis and treatment.

Bronchiectasis and true cystic lung disease may be confused where cysts have become infected, but most patients with bronchiectasis have no cysts.

Putrid lung abscess is becoming more and more a surgical disease with us since Neuhoff devised a method for more accurate localization.

DR. WALTER L. NALLS, Richmond: I enjoyed Dr. Vinson's paper and the discussion very much. Dr. Vinson has covered a great deal of territory, although at the outset he rejected those cases associated with tuberculosis and the like.

The role of bronchoscopy in abscess of the lung has been firmly established. A number of patients with lung abscess are definitely benefited by bronchoscopy. If a stricture can be determined it should, of course, be dilated, but in many patients even when no stricture is demonstrable, drainage is often improved following bronchoscopy. We have thought that shrinking solutions instilled into the bronchus have been helpful and we have also used the sulfonamide drugs—both in solution and in the powdered form.

So far as bronchiectasis is concerned, the only cure of this disease is the surgical excision of the affected portion of the lung. Any other form of treatment given these patients is more or less palliative or symptomatic, and this includes the blowing in of drugs, such as the sulfonamides. As Dr. Harrell has expressed, I, too, believe that the instillation of iodized oil gives many of these cases some symptomatic improvement. Aside from its value as a therapeutic agent, iodized oil is indispensable diagnostically. X-ray films made following the intrabronchial instillation of this opaque medium give most accurate information as to the location of the disease, the lobes affected, the extent of the disease, etc. The bronchoscopic appearance is also helpful.

Dr. Vinson has emphasized the advantages of the proximal-lighted bronchoscope. I doubt very seriously that one can visualize the tracheobronchial tree a great deal better with this instrument than with the distal-lighted bronchoscope. I question also that one can see around the corner into the upper lobe bronchi better with the proximal than with the distal-lighted instrument.

DR. VINSON, closing the discussion: I shall first attempt to answer Dr. Harrell's question in relation to the differentiation between embolic and aspiratory abscess. In many instances when operative procedures have been done around the nose or throat and pulmonary abscess develops, it is difficult to determine whether it has resulted from aspiration of infected material into the bronchi or from infection which has been carried into the lung through the blood stream. When operative procedures under local anesthesia have been employed on infected areas remote from the respiratory tract where direct aspiration of material from the site of infection is impossible and pulmonary abscess develops, it is generally assumed that the abscess is the result of emboli that have found lodgment in the lung. In true aspiratory abscess the lesion probably begins as ulcerative bronchitis and the cavity results as much from obstructive emphysema as from actual disintegration of pulmonary tissue. In aspiratory abscess bronchial narrowing is almost always encountered, but in an abscess that has begun in the parenchyma of the lung and later ruptured into a bronchus, stenosis of the bronchial lumen may not be present. Another point of differentiation is that embolic abscesses frequently are multiple, whereas aspiratory abscess usually is single.

Of course, the distinction between abscess that results from aspiration and that which results from embolus is purely academic. The major clinical consideration is that aspiratory abscess responds more favorably to bronchoscopic aspiration. Rest, of course, is advisable in the treatment of pulmonary abscess during the febrile period. After the temperature becomes normal, it has always been my impression that better drainage is provided if the patient is reasonably active. I agree with Dr. Cole that induced pneumothorax should not be employed in the treatment of pulmonary suppurative lesions. Empyema may follow this procedure, in which case external surgical drainage is required.

I believe that every patient with pulmonary suppurative disease should have at least one bronchoscopic examination, for the reason that it is not possible by other means to distinguish between ordinary suppurative lesions and those resulting from tumor or foreign body. For bronchoscopic examination I prefer the proximally illuminated bronchoscope because the light is directed into the depths of the tracheobronchial tree, and much better visualization is thus obtained.

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NEPHRECTOMY

With Comments on Diagnostic Procedures in Obscure Conditions*

T. JEFFERSON HUGHES, M.D.,
Roanoke, Virginia.

I am reporting this case to illustrate the importance of using the x-ray and cystoscope as a routine procedure in all cases of questionable diagnosis, even though there are no symptoms of kidney pathology.

The diagnosis in this case was accidentally made during a gastro-intestinal x-ray study.

The infection leading to nephrectomy often has its origin outside of the kidney and the patient is usually referred to the surgeon after a correct diagnosis has been made and preliminary treatment has been given. It is the rare and obscure condition, presenting no symptoms of kidney pathology, which may lead one into the pitfall of a wrong diagnosis.

Should renal calculi be the primary and the exciting factor of the infection, the x-ray will reveal the size, number, and location of the stones, as well as the extent of the destruction of the parenchyma of the kidney. The lungs should be carefully examined, including x-ray examination in all cases, particularly in suspected tuberculosis of the kidney, as this will often be a deciding factor as to the advisability and extent of operative procedure.

Tuberculosis of the kidney is probably the most frequent condition necessitating nephrectomy. The kidney involvement is generally considered to be secondary to tuberculosis in some other part of the body, most frequently of the respiratory system. The tubercle bacilli are deposited in the kidney from the blood stream and are most frequently picked up from the lymph nodes in the lungs. It is, I believe, an established fact that the presence of tubercle bacilli in the urine indicates the existence of tuberculosis in one or both kidneys. Both kidneys may have received the bacilli in the beginning but one may have thrown off the infection while the other succumbs, hence the frequent clinical picture of unilateral involvement. Bilateral infection is demonstrable in about 50 per cent of cases.

The existence of tuberculosis of the kidney is claimed by Christopher[3] to be about 10 per cent of all cases dying of tuberculosis and 1 per cent of all autopsies.

In spite of the fact that the condition of the kidney is secondary, the primary focus is not always demonstrable.

The question of whether or not nephrectomy is indicated in the early stages of unilateral tuberculosis is not universally conceded and the decision is often influenced by the physical condition of the patient and his reaction to thorough treatment under the same routine procedures that are employed in tuberculosis in any other part of the body. I believe, however, that in bilateral involvement, where one kidney is far advanced and the other only slightly infected and proven to have good function, the more extensively infected kidney should be removed, with the hope of improving the remaining kidney through a general improvement of the health of the patient.

Another, and probably the next most frequent condition leading to nephrectomy is renal calculi. Large and irregular stones may be very difficult or impossible to remove, or there may be a number of small stones situated in the calices, the removal of which would so seriously destroy or impair the parenchyma of the kidney that the situation might be dealt with best by nephrectomy. If the presence of the stones has incited infection to the extent of seriously damaging the cortex of the kidney, nephrectomy should be done, regardless of the size of the stones.

Not infrequently both tuberculosis and calculi are found in the same kidney, as is illustrated in my case report.

CASE REPORT

White female, age thirty, was admitted to the Shenandoah Hospital, April 16, 1940, complaining of a weak, nervous, run-down condition. Her appearance was that of a poorly nourished, emaciated individual, with lack of appetite and a history of digestive disturbances over a long period of time.

The blood picture was as follows: 3,130,000 red blood corpuscles, 5,670 leucocytes, 65 per cent hemoglobin, .92 color index, 64 polys, 35 lymphs, 52 segs, 8 stabs, 1 eosn, and 3 monos. The urological report showed slight trace of albumin, sugar negative, acetone negative, few pus cells, no blood, no casts, few bacteria. Cystoscopic examination revealed bladder wall normal, right ureter closed (un-

*Read before Staff Meeting at Shenandoah Hospital, November 26, 1940, and illustrated by moving pictures.

able to introduce catheter more than one-half inch), left ureter admitted catheter without obstruction, from which urine flowed normally, and was microscopically negative. Kidney function test revealed a normally functioning left kidney. X-ray report: "Pyo-nephrosis with stones in right kidney." Chest examination revealed evidence of arrested tuberculosis in the left lung. Microscopic examination of sputum was negative for tuberculosis. Heart examination was essentially negative, except for weakness.

The patient was kept in the hospital under supportive treatment and nutritive diet three weeks before nephrectomy was performed. Notwithstanding the presence of two large irregular stones and the destruction of most of the parenchyma of the kidney, she entered the hospital with no symptoms referable to the kidney. Auto-nephrectomy had occurred sometime prior to her coming under our observation.

OPERATION.—Through a lumbar incision the kidney was easily exposed, due to thin, relaxed muscles and, in spite of numerous adhesions, it was delivered into the incision with little difficulty without having to sever any muscle fibers. After injecting about ten drops of carbolic acid into the ureter, the pedicle was clamped by two forceps and severed between the forceps by an electric cautery, and ligated in two places with No. 2 catgut. The incision was closed without drainage. Healing was by first intention, and the patient left the hospital on the fourteenth postoperative day.

SUMMARY

Renal tuberculosis is secondary to tuberculosis in other parts of the body, most frequently of pulmonary origin. X-ray of lungs and kidneys should always be made. Auto-nephrectomy in the case reported, with normal urinary findings, would have led to an erroneous diagnosis without x-ray.

The bacilli of tuberculosis are deposited in the kidney through the blood stream, frequently from the respiratory system. Renal tuberculosis rarely, if ever, ascends from the lower urinary tract.

At least 50 per cent of renal tuberculosis is bilateral when diagnosed, although a much larger per cent is probably bilateral in the early stages of the infection.

The treatment of renal tuberculosis is both medical and surgical. The patient's resistance should be built up by prolonged sanitarium care before surgery is undertaken.

Drainage should not be employed after the removal of a tubercular kidney, if one is reasonably sure that the incision is not infected, since in these cases a fistulous tract is apt to follow, which is difficult to heal.

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Shenandoah Life Building.

UTERINE CONTRACTIONS IN LABOR

EFFECT OF ANALGESIC DRUGS

WILLIAM BICKERS, M.D.,
Richmond, Virginia.

The last decade has seen the almost universal acceptance of certain amnesic and analgesic drugs for the relief of pain in labor. Their effect upon uterine contractions has been the subject of much debate. It would seem that a study which throws some light on these drugs and their effect on the expulsive forces of labor would be timely.

This report is concerned with a study of morphine, hyoscine, sodium amytal, nembutal, and ether upon the contractions of labor. These drugs were selected because of their general use as amnesic and analgesic agents.

TECHNICAL PROCEDURE

The patients selected for this study were among those under my care at the Evangeline Booth Hos-

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pital in Richmond, Virginia. They came to the hospital some weeks in advance of their expected confinement; thus it was possible to gain their confidence, so that after explaining the nature of the experimental procedure, their cooperation was obtained without difficulty. No intra-partum or puerperal complication has arisen which could be attributed to the experiment. All of the patients were primiparae. Only those were used for this study who presented no obstetrical complication and in whom no complication was anticipated.

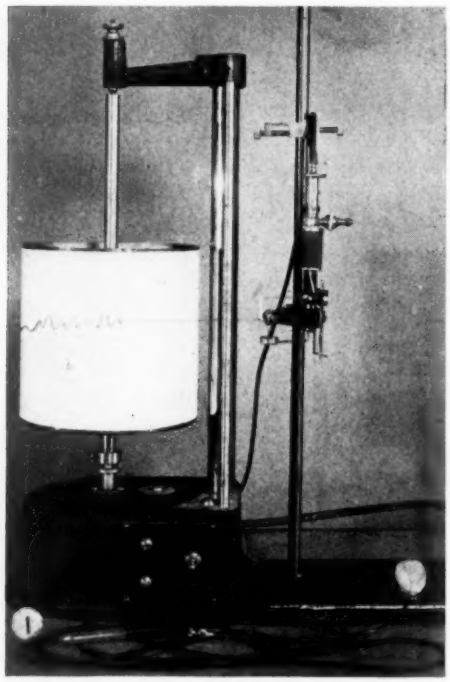


Fig. 1.—A small condom balloon attached to a heavy woven catheter and connected by way of a rubber tube to the mechanical ink recorder. The ink recorder is so arranged that its writing point records the tracings of uterine contractions on the kymograph.

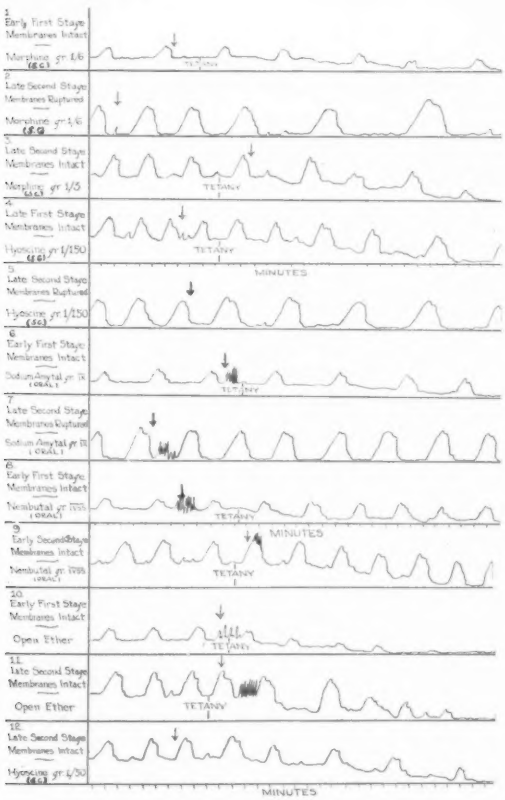
A small condom balloon attached to a long, heavy, woven catheter was inserted into the uterus between the membranes and the uterine wall. With the aid of a uterine dressing forceps it was possible to accomplish this in many cases without rupturing the membranes. The balloon and catheter were inserted early in labor before the presenting part became fixed in the pelvis. It was passed high up into the fundus, well beyond the lower uterine segment. The opposite end of the catheter was connected by way of a rubber tube to the mechanical ink recorder. The balloon, catheter, and tube were previously sterilized. The system was then filled with sterile water and the pressure raised to about 80 mm. of mercury. The mechanical recorder was so mounted that its writing point recorded the uterine contractions upon the revolving kymograph equipped with a "timer". The balloon and catheter remained in the uterus until after delivery of the fetus and were either expelled with the fetus or with the placenta.

Effect of Morphine Sulfate

The effect of morphine sulfate has been observed and recorded on four cases. Similar tracings followed the administration of the drug in all of the four. The effect of this drug was first recorded on a young primipara in the early first stage of labor. Labor had begun spontaneously two hours before the tracing was taken. The contractions were characteristic of those usually seen at this stage of labor. They occurred at intervals of about six minutes and had a relatively low amplitude superimposed on a moderate degree of tetany. Morphine sulfate, gr. 1/6 was given subcutaneously at the point indicated by the arrow. After twenty minutes it may be seen from the tracing (No. 1) that there is a slow but steady drop in the base line. This indicates the relaxing effect of morphine upon uterine tone. There is little effect upon the amplitude of each contraction. The interval between contractions is lengthened to about eight minutes. The second tracing (No. 2) was taken on another patient during the second stage after spontaneous rupture of the membranes. The contractions of this stage after rupture of the membranes are quite different from those seen in the early first stage. Rupture of the membranes as previously reported diminishes tone and results in a great increase in the amplitude of each contraction. Morphine sulfate, gr. 1/6 was given subcutaneously at the point indicated. After thirteen minutes there was some lengthening of the interval between contractions, but no marked effect upon the amplitude of each contraction. In fact, it is possible that the expulsive efficiency may actually be enhanced by the somewhat prolonged interval of rest between contractions. This cannot be proven, however.

In order to demonstrate the effect of a larger dose or morphine upon the uterus in labor another case was selected for study. The contractions were those of a primapara in the early second stage with the

membranes still intact. At this stage with intact membranes the uterus is normally very tetanic with contractions occurring at frequent intervals. Morphine sulfate, gr. 1/3 was injected subcutaneously at the point indicated. After eight minutes it can be seen on the tracing (No. 3) that the contractions begin to drop towards the base line. Uterine tonus was very promptly relaxed, but not completely abolished. The amplitude of each contraction became progressively lower until the expulsive efficiency was greatly reduced.



It may be concluded that morphine sulfate in small doses slightly relaxes the uterine tonus, prolongs the interval between contractions, and has little effect on the amplitude of each contraction. Larger doses abolish all uterine motility. The relaxation of uterine tonus by small doses of morphine probably increases the expulsive efficiency of the uterus. The myometrium being relaxed between contractions has a better chance to recover during its resting phase. Certainly the muscle fibres should, under these conditions, have less tendency to fatigue.

Effect of Hyoscine

Hyoscine is widely used for its amnesic effect during labor. Often used clinically in combination with morphine or the barbiturates, it was obviously better for the purpose of this investigation to study the effect of the drug acting alone. Three patients were selected for study of this drug during labor. In all of them the balloon was introduced early in labor and it was expelled after completion of the second stage. The most frequently used dose in actual practice is 1/150 gr. and so this was used on these patients. Since the effect of the drug was the same in all three cases, the tracing is shown on only one of them. Here the first tracing was taken ten hours after the onset of spontaneous labor. Contractions were occurring every three minutes and the cervix was three-fingers dilated (No. 4). It will be noted that the contractions are typical of late first stage as full dilatation of the cervix is approached. The contractions have a moderately high amplitude superimposed on a hypertonic uterus. The tone becomes progressively greater during labor until rupture of the membranes. This will soon be reported. Hyoscine, gr. 1/150 was given subcutaneously at the point indicated by the arrow. No alteration in the nature of the contractions themselves is noted, but the interval is increased and the uterine tone diminished. Another tracing (No. 5) shows the effect of hyoscine upon uterine contractions during the late second stage after spontaneous rupture of the membranes. The contractions in this stage have a much higher amplitude, each returns to a lower base line as a result of rupture of the membranes, and hyoscine seems to have no effect except perhaps to lengthen slightly the interval between contractions. This is not sufficiently marked, however, to be noteworthy. It is seen that the effect of hyoscine is similar to that of morphine, diminishing the amplitude and the tonus of the uterus.

It is possible practically to abolish uterine contractions with large doses of hyoscine. Note the almost complete absence of contractions after 1/50 gr. of hyoscine as shown in the tracing (No. 12) which was taken on another patient in the late first stage. Even this large dose does not seem to alter the uterine tonus, however, because the contractions do not return to the base line.

Effect of Sodium Amytal

One of the most popular of the barbiturates is sodium amytal. For the purpose of this sodium

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amytal, gr. ix orally was given at the point on the tracings noted with an arrow. Three patients have been studied during labor with this drug. The effects upon uterine contractions were identical in all three. The first tracing (No. 6) was taken during the early first stage two hours after the onset of spontaneous labor. The low amplitude, mildly tetanic, long interval contractions are typical of this stage. The tracing was allowed to run for one hour after administering the drug, but no marked effect upon the contractions could be noted except slight diminution of tonus. The amplitude of the contractractions remained about the same. After twenty minutes, the relaxing effect becomes apparent as the contractions gradually descended to a slightly lower base line. This indicates that the drug diminishes uterine tonus. This fact assumes more importance when it is recalled that the normal sequence of events is for the uterus to become more tonic as the end of the first stage is approached with membranes intact. This drop in base line was noticeable in all cases and, therefore, I think we are justified in saying that sodium amytal diminishes the tonus of the intra-partum uterus. No effect upon the amplitude or the interval can be seen on the tracing.

Another tracing (No. 7) shows the effect of sodium amytal in the late second stage after spontaneous rupture of the membranes. No effect upon the amplitude or interval is seen. Uterine tonus has been diminished by rupture of the membranes.

It may be concluded that sodium amytal in the dose described has no effect upon the contractions themselves, but does induce relaxation between contractions.

Effect of Nembutal

Three cases have been studied during labor to determine the effect of nembutal upon uterine contractions in labor. Nembutal, gr. ivss was employed, as this is the most frequently used clinical dose. The arrow marks the point where the drug was given orally. The first tracing (No. 8) was taken four hours after the onset of spontaneous labor at term. The cervix was two-fingers dilated. The contractions were typical of the early first stage. They had a low amplitude, moderate tonus, and occurred every five minutes. About fifteen minutes after the drug was given it can be seen from the tracing that there began a drop in the base line to which each contraction returned. The uterus began to relax well between each contraction. This permits more complete rest between each contraction. The second tracing (No. 9) was taken on the same patient five hours later when the cervix was just fully dilated. The membranes were still intact. Note the marked tonus upon which each contraction is superimposed. Ten minutes after the drug was given the tonus began to diminish as indicated by the falling base line. Fifteen minutes after the drug was given the tonus has been practically abolished and the relative amplitude of each contraction is increased as a result of relaxation between contractions. There is no effect upon the interval between contractions.

It may be concluded that nembutal in amnesic doses does not interfere with the frequency of contractions; it releases the tone and by increasing the relative amplitude of the contractions, improves the expulsive efficiency of each contraction.

Effect of Ether

The effect of open cone drop ether has been studied on two patients. The results were similar in the two cases and so only one is shown in the tracings. The first tracing was taken two hours after the onset of labor while contractions were occurring every four minutes. Ether was dropped on the open cone at the rate of one drop every second. It may be seen from the tracing (No. 10) that the first effect of ether was to abolish tonus. The contractions first dropped to a lower base line and then the amplitude of each became progressively smaller until all uterine motility was abolished. After ten minutes of ether administration it was discontinued. Thirty minutes were required after stopping the ether for the contractions to recur to the point where they could be recorded. Twelve hours after this first tracing a second one was recorded (No. 11) during the late second stage when the membranes were intact. The contractions were typical of those in the late second stage with ruptured membranes. The contractions had a high amplitude, and there was hypertonus. The first effect of ether is to abolish tetany and then the contractions, until all uterine motility is abolished at the end of ten minutes.

Conclusions

1. The extra-ovular, high fundal, intra-uterine balloon connected through a closed water system to a mechanical ink recorder has been used to study the effects of certain drugs upon uterine contractions during labor.

2. Morphine in small doses, gr. 1/6, has no effect upon the amplitude, slightly prolongs the interval, and diminishes tonus. Larger doses, gr. 1/3, may abolish uterine motility.

3. Hyoscine in small doses, gr. 1/150, has no effect upon the amplitude, slightly prolongs the interval, and diminishes the tonus. Larger doses, gr. 1/50, may abolish uterine motility.

4. Sodium amytal in amnesic doses, gr. ix, has no effect upon the amplitude, does not prolong the interval, diminishes tonus.

5. Nembutal in amnesic doses, gr. ivss, has no effect upon the amplitude, does not prolong the interval, diminishes tonus.

6. Open drop ether first abolishes tonus and then the contractions. Thirty minutes are required after ether is discontinued for the uterus to regain its motility.

7. Amnesic and analgesic drugs diminish uterine tonus, thus permitting more complete relaxation of the uterus between contractions. This effect should increase uterine muscle efficiency by delaying or preventing fatigue.

807 West Franklin Street.

A HORMONOLOGIC CONSIDERATION OF FUNCTIONAL DYSMENORRHEA.

R. L. PULLEN, M.D.,
and
E. C. HAMBLEN, M.D.,*
Durham, North Carolina.

The subject of a voluminous literature presenting diverse and equivocal opinions, dysmenorrhea remains today one of the most perplexing problems in gynecology. The explanation of menstrual pain may be sought, perhaps, in the physiological changes experienced by the woman in the childbearing period as preparation for possible pregnancy, these cyclic alterations resulting in pelvic discomfort of varying degree. Unfortunately, the clinical consideration of the subject of dysmenorrhea from a hormonologic aspect is rendered difficut by the fact that subjective symptomatology is colored by the psychic and emotional status of the patient which is commonly altered during the menstrual flow.

The definition of the term "dysmenorrhea" is difficult. The general usage of the word denotes in a limited sense the exaggeration of pelvic discomfort during menstruation to a degree sufficient to interfere with the patient's normal mode of living. Dysmenorrhea may be attributed to organic or functional causes. The organic type is described generally as "secondary" or "acquired" dysmenorrhea, as opposed to the form ascribable to uterine changes accompanying menstrual activity and termed variously as "intrinsic", "primary", "essential", "idiopathic" or "functional" dysmenorrhea. In that connection, there is, strictly speaking, no primary dysmenorrhea as functional dysmenorrhea develops commonly several years after menarche. Furthermore, the majority of women experience minor discomfort during menses, the term "menorrhalgia" having been proposed to describe the minor menstrual molimina, but only a few note severe pain.

In the following paragraphs, the discussion will be limited to the consideration of functional dysmenorrhea, with especial reference to the hormonologic influences.

INCIDENCE

Considerable variation in the incidence of dysmenorrhea must appear necessarily inasmuch as it is not a clinical entity but a symptom subject to wide interpretation among individual women. Stone[1] estimates that 35 per cent of adult women experiences varying grades of dysmenorrhea, chief of which is functional dysmenorrhea. From a group of 840 women students entering the University of Michigan, Bell and Parsons[2] ascertained that 100 (12 per cent) complained of severe menstrual pain. Cunningham[3] completed a similar survey on 14,268 female students of the University of California, finding that, whereas approximately 50 per cent of the group noted menstrual discomfort, only one in six reported severe pain.

Further studies concerning the incidence of dysmenorrhea disclose equally varied conclusions. Quoting the observations of M. Hodge on 974 apparently healthy girls, Novak[4] reported that 68.8 per

*From the Endocrine Division of the Department of Obstetrics and Gynecology, Duke University School of Medicine and Duke Hospital.

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cent had no menstrual pain, whereas the remaining 31.2 per cent experienced varying degrees of dysmenorrhea which, in 5.3 per cent of the group, was sufficiently severe to prompt rest in bed. In an analysis of 4,500 consecutive patients, Emge[5] noted a strikingly low incidence of dysmenorrhea, finding that 130 or 2.8 per cent complained of functional dysmenorrhea. On the other hand, Lakeman[6] found that 327, or 89.6 per cent, of 365 industrial workers suffered menstrual pain. Conclusions concerning this strikingly high incidence of dysmenorrhea are not permitted in view of the fact that industrial workers might seize every opportunity to absent themselves from work or that this group might be influenced unfavorably by the less intelligent presumption that menstruating women are semi-invalids.

In his monograph on dysmenorrhea, Davis[7] further emphasized the unreliability of statistical data concerning the incidence of dysmenorrhea. He estimates that 1 to 5 per cent of all young women are incapacitated for one or more days during each episode of uterine bleeding. From studies of 302 presumably healthy girls throughout four years in college, Miller[8] reported that 48 per cent experienced some menstrual pain. Among Irish girls, Browne[9] stated that 65 per cent have dysmenorrhea in some form, the group including 31 per cent of healthy school girls, 42 per cent of outdoor girls, and an even greater percentage of girls engaged at manual labor. It would appear, therefore, that possibly 50 per cent or less[10] of healthy women experience dysmenorrhea of varying degree and that possibly 1 to 5 per cent is forced to retire during particularly severe bouts of menstrual pain.

THEORIES CONCERNING THE MECHANISM OF DYSMENORRHEA

The underlying cause of dysmenorrhea has been attributed generally to the operation of one or both factors of a two-fold mechanism: (1) disordered or spasmodic contractility of the uterine musculature; and (2) alterations in the molecular disintegration of the endometrium during the menstrual phase. The etiologic factors producing the disturbances of uterine motility or endometrial fragmentation remain obscure. A brief review of the diverse facts and theories propounded to explain the altered uterine state resulting in dysmenorrhea seems warranted prior to the discussion of the respective roles of the various principles of the endocrine glands.

DYSMENORRHEA DUE TO DISORDERED UTERINE CONTRACTILITY: This considers diverse alterations in uterine mobility resulting from various etiologic factors: (1) disordered contractility due to uterine hypoplasia; (2) increase in the frequency and amplitude of uterine contractions (3) uterine hypercontractility with resultant ischemic pain; and (4) lowered pain threshold permitting normal contractions to reach conscious levels.

In 1903, Schultz[11] and later Schröder[12] stated that hypoplasia of the uterus is the chief cause of uterine cramps. It has been stated generally that the hypoplastic uterus contains an undue proportion of connective tissue with resultant loss of elasticity, consequent interference with the vascular channels manifested by venous distention and retarded circulation and irregular uterine contractility. Pertinent clinical observations do not permit correlation with the theory of uterine hypoplasia: (1) the greater the degree of uterine hypoplasia, the greater the likelihood that the patient will not bleed. Uterine hypoplasia can be accepted commonly as an indication of ovarian failure with resultant irregularities of uterine bleeding. (2) The majority of women manifesting significant uterine hypoplasia commonly experiences painless bleeding from estrogenic endomentria whereas dysmenorrhea is associated usually with bleeding from progestational endometria. The non-existence of dysmenorrhea during the early episodes of uterine bleeding following menarche may indicate anovulatory responses, i. e., bleeding associated with estrogenic endometria. (3) Repeated clinical observations indicate that many women with juvenile or poorly developed sexual organs do not have dysmenorrhea and that many dysmenorrheic patients do not manifest uterine hyploplasia.

In 1927, Schroeder[13] noted that the uterine contractions in dysmenorrheic patients are more rapid than in normally menstruating women. Studying the relationship of pain to the character of the uterine contractions in the immediate post-partum period, Adair and Davis[14] found that the difference between painful and painless contractions was in frequency and amplitude, not in type. Kolischer[15] and Moir[16] observed in a few cases of dysmenorrhea that the uterine contractions were more forceful. Cannon[17] states that the characteristic dysmenorrheic pain, which most theories accept as being due to exaggerated muscular contractions, is essentially spasmodic or tetanic. Assuming that tetanic contractions are

evoked by a strongly muscular uterus, multiparous women should experience excessive cramping whereas primiparous women should note less severe grades of menstrual pain, a point which is not substantiated by clinical experience. Furthermore, spasmodic contractions of the uterine musculature should provoke violent emissions of blood and endometrial tissue, an assumption which cannot be confirmed clinically.

Moir[16] concluded that dysmenorrhea results from uterine ischemia due to hypercontractility, a view that Wilson and Kurzrok[18] could not accept. By means of an intrauterine balloon, they recorded the uterine contractions of one patient during severe attacks of dysmenorrhea. It was found that the intrauterine pressure during the height of an attack remained well below the systolic blood pressure (120 mm. mercury), which, in their opinion, refuted the hypothesis that uterine ischemia could have existed. Furthermore, they noted that the pressure within the balloon during some contractions exceeded the systolic blood pressure but no pain resulted. This method does not provide adequate physiologic data inasmuch as the intrauterine balloon represents a foreign body and provokes characteristic alterations in uterine contractility dependent on the nature of the balloon, the degree of distensibility, and the irritability of the uterus at the time of introduction of the balloon. Furthermore, Moir's theory is not entirely disproved inasmuch as local ischemia may exist at diverse points without altering the state of the uterus as a whole. Indeed, the continuation of the vascular phenomena producing the premenstrual ischemia and the subsequent objective evidence of menstruation may well continue throughout the flow.

Inasmuch as Phelps[19] and others believe that the motility of the human non-pregnant uterus reaches maximum just prior to the onset of menstruation and during the first few days of the menstrual flow, Phelps states that it is generally agreed that uterine contractions are the immediate cause of dysmenorrheic episodes, cautioning, however, that satisfactory evidence of the occurrence of abnormal contractions in dysmenorrheic women has not been observed. Furthermore, Kurzrok, Wiesbader, Mulinos and Watson[20] emphasize that a uterine contraction is not always simultaneous with the subjective sensation of a cramp.

Wilson and Kurzrok[18, 21] believe functional dysmenorrhea to be ascribable to a state wherein normal uterine contractions during the phase of maximum amplitude reach conscious levels, but they do not offer an explanation for the reduction of the pain threshold to a degree sufficient to account for pain perception. Alterations in individual sensitivity and responsiveness to painful stimuli may be induced by several factors: economic stress; lowered sense of well being attributable to poor constitutional health resulting from acute and chronic debilitating states, foci of infection, anemia, vitamin deficiencies and inanition; inadequate maintenance of general body metabolism by insufficient exercise; pelvic congestion ascribable to diverse organic pathology and constipated states; insufficient sexual gratification; and anxiety states of various grades and causes.

The theory that dysmenorrhea is ascribable to disordered or spasmodic uterine contractility cannot be accepted until ample clinical evidence is submitted that the uterine motility of normal women pursues a cyclic pattern and that significant alterations of uterine motility occur in dysmenorrheic women.

DYSMENORRHEA DUE TO ALTERED ENDOMETRIAL FRAGMENTATION: This theory relates the faulty endometrial separation or disintegration to diverse factors capable of producing menstrual pain: (1) abnormal detachment of the endometrial fragments; (2) altered uterine contractility provoked by the endometrial fragments acting as a foreign body within the uterus; and (3) excessive progestational response induced by overactivity of the luteinizing hormone of the anterior pituitary body or increased production of intrinsic progestin.

In 1926, Whitehouse[22] advanced that any abnormal detachment of the decidual fragments is invariably associated with pain. In considering this theory, Cannon[17] argues that if irregular uterine contractions bear causal relation to and were not the result of abnormal separation of the menstrual endometrium, such abnormal separation would be anticipated in every case of dysmenorrhea.

Cannon[17] suggests that the endometrial tissue acts as a foreign body provoking uterine contractions (a view expressed by Ehrenfest, 23, in 1908). In a somewhat similar approach, Blair-Bell[24] stated in 1923 that dysmenorrhea results from the expulsion of blood clots. This theory is difficult to accept inasmuch as the total capacity of the non-gravid uterus does not commonly exceed 2 cc., that the production of blood clots implies the existence of a relaxed and boggy uterus, and that 40 per cent of normally men-

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struating women[17] associate blood clots with the menstrual blood.

Impressed by the observation that the marked decidual-like reaction in cases of membranaceous dysmenorrhea suggested on actual accentuation of the progestational phase, Cannon[17] concludes that an overactivity of the corpus luteum hormone is existent, which, in turn, is due to an overactivity of the luteinizing hormone of the anterior pituitary. Valid conclusions are not permitted inasmuch as membranaceous dysmenorrhea is rare; that large amounts of injected progesterone (25 mg. daily for ten days) in the last half of the menstrual cycle will not produce membranaceous dysmenorrhea nor menstrual fragmentation in the form of casts; that greater quantities of progesterone decrease the likelihood of fragmentation; and that this theory is diametrically opposed to the assumption that dysmenorrhea results from corpus luteum deficiency.

ENDOCRINE THEORIES OF FUNCTIONAL DYSMENORRHEA

The growth of endocrinologic knowledge has assigned to the endocrine glands a role of increasing importance in the etiology and treatment of functional dysmenorrhea. In general, the basis of the endocrine theories concerning the etiology of dysmenorrhea and its therapy with endocrine principles is to be found in the antagonistic effects of estrogens and progestin, respectively, on uterine contractility. Studies on the uterus of the normal adult rabbit by Novak and Reynolds[25] have demonstrated that estrogens produce oxytocic effects, whereas progestin[26, 27, 28] tends to inhibit rhythmic uterine activity. It has been postulated that the uterus tends to lose its tone and rhythmic activity immediately following ovulation, the decreased contractility being dependent upon the production of the corpus luteum hormone. Knaus[29] ascribes a similar behavior to the human uterus.

As a result of the obscurity surrounding the etiology and the mechanism of dysmenorrhea and the hormonologic influences presumed to contribute to the production of menstrual pain, diverse endocrine preparations have been employed in the therapy of functional dysmenorrhea. The various endocrine theories and the rationale of the respective endocrine therapy may be reviewed briefly:

DYSMENORRHEA RELATED TO ALTERED ESTROGENIC METABOLISM: This relates the altered uterine contractility to faulty estrogenic metabolism represented by a three-fold mechanism: (a) estrogenic deficiency; (b) excessive estrogens; and (c) estrogenic imbalance. The clinical data supporting each theory may be considered briefly:

(a) *Estrogenic Deficiency:* Contrary to the existing theories that estrogens stimulate rhythmic uterine activity, numerous and varied reports of their therapeutic value in dysmenorrhea have appeared. Complemental therapy with estrogenic substance in dysmenorrheic patients has been prompted by the association of dysmenorrhea with uterine hypoplasia, oligomenorrhea and hypomenorrhea,[30, 31] thus suggesting hypoovarianism as the fundamental disturbance. The *modus operandi* of such therapy is equivocal.

Blotevogel and Poll[32] and Kennedy[33] have demonstrated that castration produces degenerative changes in the ganglia of Frankenhäuser and that estrogenic therapy will remedy the degenerative processes. Accordingly, Kennedy[34] states that the diminution of estrogenic substance produces alterations of the sympathetic nerve supply to the uterus with the resultant development of dysmenorrhea. Without stating dosages, Kennedy[34] reports that he obtained complete relief in ten cases, improvement in thirty and no amelioration in ten instances upon a therapeutic regime of estradiol and various ovarian extracts ("sistomensin", ampacoids" and "ovacoids"), basing the rationale, as noted above, upon the restoration of the cervical ganglia. Wintz[35] employed an ovarian extract ("sistomensin") in 125 cases of dysmenorrhea, administering 5 cc. daily for a period of several days prior to menstruation. He reports complete relief in eighty-two, improvement in fifteen and no effect in twenty-eight cases.

To his dysmenorrheic patients Tunis[36] administered six injections of 1,000 M. U. each of estrone ("Menformon") beginning fourteen days after the onset of the last episode of uterine bleeding. He reports that sixty-five of seventy-five patients were cured and eight were improved. Kaufman[37] likewise reports encouraging results with estrogenic therapy.

Goldberg and Lisser[38] treated forty dysmenorrheic women with estriol glucuronide (emmenin), obtaining remarkable improvement in more than 60 per cent. Watson[39] obtained gratifying results with "emmenin" in 105 cases of dysmenorrhea. He found complete relief in forty-nine patients, the beneficial results lasting as long as six months after cessation of treatment in twenty-one of these cases, partial

relief in twenty-seven patients and no alteration of the menstrual pain in twenty-nine cases. Analyzing the effectiveness of emmenin therapy in a series of 472 patients manifesting various menstrual symptoms and irregularities, Campbell[40] found that the best results in dysmenorrheic patients was obtained when treatment with "emmenin" was continued throughout at least three consecutive menstrual cycles. In an evaluation of diverse forms of endocrine therapy in thirty-nine cases of severe dysmenorrhea, Israel[41] reports that three patients in a group of ten were relieved by one tablespoonful (75 day-oral units) of "emmenin" three times daily for three or four months. Hamblen[10] concluded that he obtained the most consistent results in functional dysmenorrhea from the oral administration of estriol glucuronide ("emmenin") in daily doses of 480 day-oral units. He frequently supplemented this treatment with the intramuscular administration of 10,000 to 20,000 international units of injected estrogens on the eleventh and the thirteenth days of the cycle, continuing therapy for three or four months. Hamblen suggested that this form of therapy may possibly alter the metabolism of progestin.

Wilson and Kurzrok[18, 21] report that 70 per cent of their dysmenorrheic patients treated with injected estrogen in the form of estradiol benzoate obtains relief. Emge[5] found theelin to be of value in six cases of a group of twelve dysmenorrheic patients, though moderate improvement only was obtained in four of the six cases.

Bishop, Boycott and Zuckerman[42] report two patients with dysmenorrhea completely relieved by the daily administration of 1 mg. tablets of stilbestrol, a synthetic preparation possessing estrogenic properties, during the last half of the cycle. Similar relief was obtained from four injections of 5 mg. of estradiol benzoate.

Special mention should be made herein of a recent paper by Sturgis and Albright[43] in which, in a study of twenty-five cases of dysmenorrhea, they report that injected estrogenic therapy consisting of 1.5 mg. of estradiol benzoate starting on the sixth day of the cycle and continuing, at three-day intervals, for six injections will prevent the development of a corpus luteum and will subsequently be followed by a cramp-fee period. They believe the presence of an apparently normal corpus luteum to be a prerequisite for the occurrence of functional dysmenorrhea, a view shared to some degree by Hamblen[10] and Wilson and Kurzrok.[18, 21] It is not known whether ovulation is related to the development of menstrual cramps by virtue of the fact that the endometrium thereby becomes progestational in character or due to the fact that progestin exerts a direct action upon the myometrium. They note, however, that depression of corpus luteum development by estrogenic therapy cannot be achieved in two successive cycles, recommending therefore, that estrogenic therapy of this type be given during alternate months.

Mazer and Israel[44] likewise note more success generally by the administration of relatively large doses of estrogens. They report absolute relief of menstrual pain in ten of thirteen patients to injected estrogens consisting of 5,000 to 10,000 R. U. of estradiol benzoate every fourth day throughout a span of three to four months.

Hamblen, Cuyler, Pattee and Axelson[45] were unable to confirm the results of Sturgis and Albright. Hamblen and his group report that estrogens employed in ordinary dosages not only fail to depress corpus luteum function, but actually may enhance it, attributing, therefore, the clinical responses reported in dysmenorrhea and other conditions as being more likely related to this latter action.

Stimulational therapy with the equine gonadotropin (gonadogen) designed to induce greater production of estrogens in dysmenorrheic patients manifesting estrogen deficiency has been employed throughout the first half of the menstrual cycle by Shute.[46]

In a critical evaluation of these reports, it is apparent that estrogenic therapy, though unsubstantiated by physiologic evidence, may prove its effectiveness clinically by diverse mechanisms: (1) development of hypoplastic pelvic structures with accompanying increase in vascularity and improved metabolism of estrogenic principles and progestin; (2) depression of corpus luteum development; (3) enhancement of corpus luteum metabolism, possibly by altered or improved endometrial substratum; (4) restoration of the degenerative processes in the sympathetic nervous pathways, especially the cervical ganglia, which have been related to estrogenic deficiency; (5) unexplained pharmacological effects resulting in higher threshold to pain perhaps by means of improved general metabolism with resultant increase of sense of well-being; and (6) conceivably by an undetermined role of heterosuggestion.

On the other hand, pertinent clinical observations

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do not permit unqualified acceptance of the theory of estrogenic deficiency: (1) Estrogenic hormones normally are not demonstrable at the time of menstruation; indeed, relative deficiencies of estrogens, progestin and gonadotropins[10] occur prior to the onset of the menstrual flow. (2) The endometrial findings[10, 66, 41] in dysmenorrheic patients commonly reveal diverse grades of progestational response, whereas the bleeding associated with estrogenic endometria (thought to be synonymous with more severe grades of ovarian failure)[47, 48] is usually painless. (3) Many women with hypoplastic pelvic organs commonly do not have dysmenorrhea; and conversely.

(b) *Excessive Estrogens:* This widely quoted theory, based on the observations of Novak and Reynolds,[25] attributes functional dysmenorrhea to an excess of estrogenic substances which stimulate uterine activity. Progestin deficiency may or may not be associated. Rational therapy, according to this theory, would constitute injected progesterone in order to depress rhythmic uterine activity ascribable to the oxytocic effects of estrogenic substances.

The following objections to this theory may be cited briefly: (1) Whereas hyperestrogenic endometrium is related presumably to a relative excess of estrogenic substances or hypersensitivity of the endometrial responsiveness to estrogenic stimulation, the bleeding associated with this form of endometrium is commonly painless. (2) The peak of estrogenic concentration is attained generally at the time of follicle rupture but, except for women with "Mittelschmerz", few women experience pain at that time. (3) As noted above, relative estrogenic deficiency commonly occurs prior to and during the menstrual flow. (4) Endometrial correlates in dysmenorrheic patients demonstrate repeatedly the preponderance of progestational endometria, whereas estrogenic excesses would imply development of estrogenic endemetria. (5) Although relative estrogenic excesses, i. e., estrogenic activity unopposed by the appearance of the corpus luteum principle due to anovulatory cycles, occur in the adolescent girl following menarche, the bleeding commonly is painless for the first two or three years, or until sufficient maturation of the ovaries has taken place to permit corpus luteum development. (6) The bleeding occurring in patients with granulosa-cell tumors of the ovaries (true estrogenic excess) is generally painless, as well as associated with diverse grades of estrogenic endometria.

(c) *Unbalanced Estrogens:* This theory of unbalanced or unopposed estrogenic activity stimulating uterine contractility with the resultant development of dysmenorrhea differs from the theory of estrogenic excess only in degree. It implies partial corpus luteum failure of the ovaries with inadequate progestin to balance estrogenic activity. Substitutional therapy with progesterone is indicated.

DYSMENORRHEA RELATED TO ALTERED PROGESTIN METABOLISM: As indicated above, alterations in progestin metabolism have been related causally to dysmenorrhea by a two-fold mechanism: alterations in uterine contractility, and faulty endometrial disintegration during menstruation. Three grades of altered progestin metabolism are presumed to exist: (a) progestin deficiency; (b) progestin excess; and (c) inadequate progestin metabolism ascribable to relative estrogenic deficiency.

(a) *Progestin Deficiency:* That functional dysmenorrhea may be due to a deficiency of the corpus luteum hormone (progestin) is ascribed to strong uterine contractions stimulated by an augmented production of estrogenic substances which, in turn, are not held in abeyance by ample intrinsic progestin. According to Witherspoon[49] and Novak,[25, 50] rational therapy, therefore, would consist in supplying the corpus luteum preparation or stimulating an increased output of intrinsic progestin by the luteinizing principle of pregnancy urine. In that connection, Witherspoon reports relief of menstrual pain in thirteen of seventeen patients treated by daily intramuscular injections of 250 rat units of chorionic gonadotropin (follutein) for three to four days preceding the anticipated flow.

In eleven selected cases, Campbell and Hisaw[51] demonstrated that temporary relief of menstrual pain may be attained by progesterone therapy though permanent effects could not be evaluated. Elden and Wilson[52] note complete relief in eight of seventeen dysmenorrheic patients, partial relief in two and no relief in seven instances treated by progesterone therapy. Israel[53] reports the administration of progesterone in the treatment of premenstrual tension, obtaining cure in one instance and temporary relief in six patients.

Lubin, Clarke and Reynolds[54] found that afterpains could be relieved by progesterone therapy and that the relief was attained before any significant alterations in uterine contractility could be demon-

strated. Further gratifying reports concerning the efficacy of progesterone therapy in functional dysmenorrhea have been presented by Urdan,[55] Allen,[56] Knaus,[57] Bishop, Cook and Hampson,[58] Fluhmann,[59] Lackner, Krohn and Soskin,[60] Kurzrok, Birnberg and Livingston,[61] Israel[41] and others.

Frank, Goldberger and Felshin[62] employed the oral preparation of pregneninolone (anhydro-hydroxy-progesterone, ethinyl testosterone; pregnen-in-on-3-ol-17) in twenty cases of dysmenorrhea, reporting that seven patients were completely relieved while continuing therapy but noted return of the dysmenorrhea upon discontinuation of therapy. Six of their patients experienced considerable to partial relief whereas seven were unrelieved. They conclude that the effectiveness by the oral route approximately parallels that obtained by intramuscular injection of progesterone.

Hamblen[10] finds progesterone therapy of little value in his group of dysmenorrheic patients.

The concept that dysmenorrhea may be attributed to progestin deficiency is difficut to harmonize with diverse clinical observations: (1) Studies of corpus luteum function by pregnandiol determinations (an excretionary product of corpus luteum metabolism) by Hamblen and his group[63] and Venning and Browne[64] indicate that the corpus luteum normally undergoes degeneration two or three days prior to the onset of bleeding, denoting a deficiency of progestin normally at the time of the menstrual flow. (2) Endometrial studies of dysmenorrheic women by Hamblen[10, 66] and his group and Israel[41] associate dysmenorrhea commonly with progestational endometria, thus signifying the non-existence of any significant ovarian failure. (3) The observations of Smith and Smith[65] show a rise of pituitary gonadotropic substance normally prior to menstruation which may be interpreted as stimulating the output of intrinsic progestin from the corpus luteum. (4) Negative clinical evidence concerning the efficiency of progesterone therapy in functional dysmenorrhea is permitted by the studies of Kurzrok, Wiesbader, Mulinos and Watson[20] concerning the action of progesterone on the human uterus in vivo. They observed that injections of progesterone failed to diminish spontaneous uterine contractions.

(b) *Progestin Excess:* As previously noted, Cannon[17] is the chief proponent of this theory. Inadequate clinical data exists to support this theory, a comprehensive analysis of which has been presented above relative to the discussion of the endometrial fragmentation theory of dysmenorrhea.

(c) *Inadequate Progestin Metabolism:* This theory[10, 45] implies insufficient estrogens to permit adequate metabolism, utilization and excretion of the intrinsic progestin with resultant altered uterine contractility ascribable to estrogenic stimulation. Rational therapy constitutes complemental therapy with estrogenic preparations supplemented by progesterone.

DYSMENORRHEA RELATED TO ALTERED ANDROGENIC METABOLISM: As Hamblen[66] and others have emphasized, the role of androgenic substances in gynecic physiology is not known. Therapeutic explorations, however, have assigned diverse assumptions and indications for androgenic therapy of functional dysmenorrhea. In general, these consider two grades of altered androgenic metabolism: (a) androgenic deficiency and (b) androgenic excess.

(a) *Androgenic Deficiency:* The diverse theories concerning the therapeutic employment of androgens in functional dysmenorrhea may be considered briefly: (1) The use of testosterone in the treatment of functional dysmenorrhea has been suggested by its similarity in pharmacological action to progesterone.[67, 71] (2) Testosterone is said to depress the gonadotropic production of the pituitary and inhibit ovulation, indirectly retarding estrogenic production. In addition, it is presumed to favor luteinization and the maintenance of the corpus luteum, augmenting the progesterone-like effect. (3) That testosterone leads to myometrial relaxation is indicated by the studies of afterpains by Abarbanel[72]; it has furthermore been shown to exert a trophic effect[68] upon myometrial growth and to stimulate a progestational response in the endometrium.

Many clinical data have appeared concerning the gynecic employment of androgenic therapy, exhaustive surveys of which have been presented by Huffman,[73] Geist,[74] Salmon[75] and Hamblen.[66] In 1937 Desmarest and Capitain[76] reported excellent results in their dysmenorrheic patients with injections of testosterone, noting, however, that dosages varying from 400 to 2,000 mg. a month were capable of suppressing uterine flow. This fact was confirmed later by Loeser[77] and Foss.[78, 79]

Salmon, Geist and Walter[80] note that twenty-six of thirty dysmenorrheic patients obtained symptomatic relief to 250 to 300 mg. of testosterone propionate given in divided doses of 10 to 50 mg. three

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times weekly throughout the menstrual cycle. If discomfort recurred during the following cycle, the dosage of the injected testosterone was reduced to one-half the previous amount. They established the level of testosterone tolerance to be 500 mg. per month, i. e., dosages in excess of 500 mg. were apt to result in evidences of masculinization and subsequent estrogenic deficiency whereas dosages less than 300 mg. produce neither androgenic activity nor manifestations of estrogenic deficiency.

Greenhill and Freed[67, 81] report that one-half of their patients with dysmenorrhea continued to obtain clinical relief of the menstrual pain one year after discontinuation of therapy. They administered 25 to 50 mg. of testosterone propionate intramuscularly three times weekly for two weeks prior to the onset of menstruation. They caution, however, that testosterone propionate in dosages which are effective therapeutically predisposes to the induction of virilism, characterized by growth of hair on the face and body and deepening of the voice which did not improve following discontinuation of therapy.

Rubinstein and Abarbanel[68] noted gratifying improvement in twenty-six patients with dysmenorrhea treated with injections of testosterone propionate, reporting that sixteen patients obtained complete relief, that four patients were partially relieved, that four patients revealed no improvement and that two patients noted aggravation of the menstrual pain. Abarbanel[69] treated ten patients by the percutaneous administration of testosterone propionate in sesame oil with similar results.

Foss[79] reports the therapy of three dysmenorrheic patients with 10 mg. daily of methyl testosterone orally. He noted that two of the patients taking treatment of this form for fourteen days prior to menstruation obtained no relief whereas the third patient improved upon the oral administration of methyl testosterone in the middle of the cycle. The addition of bile salts[69] is said to enhance considerably the effective absorption of the methyl testosterone.

Greenblatt[82] and Rubinstein and Abarbanel[68] find testosterone propionate to be of value in the relief of premenstrual tension and molimina.

Pertinent clinical observations do not permit indiscriminate therapy of functional dysmenorrhea with androgenic principles: (1) The role of androgenic substances in gynecic physiology has not been established, thus delineating few clear-cut indications for androgenic therapy in health or disease of the woman.[66] The defeminizing and "ovarian-negating" effects produced by androgenic substances may produce profound disturbances in ovarian function in dysmenorrheic patients thought to have little significant ovarian failure. (The occurrence of progestational endometria is presumptive evidence of adequate ovarian responsiveness.) (3) As will be stated below, urinary titers for 17-ketosteroids (androgens) reveal no "androgenic" deficiency in dysmenorrheic patients; rather, there is a slight excess of "androgenic" substances. (4) The danger of induction of diverse andromimetic effects subsequent to androgenic therapy warrants caution in the employment clinically of androgenic principles.

(b) *Androgenic Excess:* In a group of twenty-nine dysmenorrheic patients, the daily urinary excretion of 17-ketosteroids (androgens) throughout at least one menstrual cycle ranged from 22 to 131 I. U., the average daily excretion being 68 I. U. These values contrast sharply with similar determinations of thirteen presumably healthy women, in whom the daily "androgenic" values ranged from 15 to 47 I. U. with an average of 34 I. U. In light of these findings, it is difficult to rationalize androgenic therapy for functional dysmenorrhea.

The excessive "androgenic" excretion may indicate a two-fold mechanism: (a) relative ovarian failure in which the increase in androgenic values represents compensatory activity by the adrenals[83]; (b) alterations in the neuro-endocrine sympathies in which the anticipatory molimina of menstruation provokes neurogenic responses generally by the apprehensive woman.

DYSMENORRHEA RELATED SECONDARILY TO THYROID DISEASES: As emphasized recently by Gray,[84] Pohl[85] and Emge,[5] the gynecologist notes frequently subjective improvement of dysmenorrhea to thyroid therapy in hypothyroid patients. Although the mechanism of thyroid activity in dysmenorrheic patients remains obscure, diverse alterations are doubtlessly effected by thyroid therapy: (1) improvement in the sense of well-being and altered threshold to pain as a result of the metabolic adjustment ascribable to thyroid activity generally throughout the body; (2) indirect effects mediated by alterations in the pituitary-gonadal axis with depression of follicle stimulation and augmentation of leuteinizing phenomena; and (3) peripheral effects related to improved oxygen metabolism permitting more adequate

metabolism and utilization of ovarian principles.

Critical objections to the acceptance of these theories include: (1) Inasmuch as the sensorium of the hypothyroid patient is somewhat dulled, alterations in the threshold of pain by thyroid therapy would be negative in value rather than beneficial to subjective improvement. (2) Studies of ovarian function in hypothyroid patients by Hamblen. Pullen and Cuyler[86] permit no assumption of impaired or altered endocrine function of the ovaries as demonstrated by present diagnostic criteria in thyroid deficiency states.

Therapy of dysmenorrhea in hyperthyroid states is emphasized by Hertzler and his associates[87] who observe that dysmenorrhea is associated frequently with "interstitial thyrotoxicosis". Noting that the menstrual pain improved under adequate medical and surgical management of the hyperthyroidism, they termed the menstrual pain as "goiterous dysmenorrhea". The mechanism of the dysmenorrhea in hyperthyroid states is obscure.

DYSMENORRHEA RELATED SECONDARILY TO ALTERED CARBOHYDRATE METABOLISM: This considers alterations in carbohydrate metabolism ascribable to diverse grades of insulin activity: (a) hypoglycemic states presumably related to excessive insulin production; and (b) faulty nutritive levels believed generally to represent relative insulin deficiency. Clinical evidence supporting these theories may be considered briefly:

(a) *Low Carbohydrate Levels:* Noting that many dysmenorrhea patients manifested nausea, vomiting and feelings of faintness, Tedstrom and Wilson[88] suggested that dysmenorrhea may be related to hypoglycemic states. They found, in a study of thirty-eight patients, that extra carbohydrate feedings at frequent intervals relieved premenstrual tension and menstrual pain in 80 per cent of their cases and that the intravenous administration of 25 cc. of 50 per cent glucose produced prompt relief in eight patients.

(b) *High Carbohydrate Levels:* Inadequate carbohydrate metabolism consequent to relative insulin deficiency implies poor general metabolism. The efficacy of insulin therapy in functional dysmenorrhea has been ascribed to a two-fold mechanism: (a) improvement in nutrition generally by improved carbohydrate metabolism; and (b) direct effects on ovarian function mediated by alterations in the pancreatico-ovarian axis.[89] Based on the studies of Fleiderbaum,[90] Poulain-Landrieu,[91] G. Williams and R. L. Williams,[92] Altschul[93] administered seven to ten units of regular insulin daily either at the onset of pain or over a period of three days prior to menstruation to a group of twelve cases of dysmenorrhea. He reports total relief of pain in ten, partial relief in one and relief in one of two periods in the twelfth case. All blood sugars were normal. He noted, however, that not every brand of commercial insulin was effective. Schrick[89] reports similar observations in a group of ten college girls.

CONCLUSIONS

Evaluation of the diverse forms of endocrine therapy advocated for the treatment of functional dysmenorrhea permits these generalizations:

(1) Every dysmenorrheic patient should receive thorough diagnostic investigation to differentiate the gynecological, medical, urological and orthopedic forms of dysmenorrhea from functional dysmenorrhea before endocrine therapy is considered.

(2) Although the endocrinologic origin of dysmenorrhea is worthy of consideration, the specific relationship remains obscure.

(3) Therapeutic trial with endocrine products is justifiable in critically selected patients, if full diagnostic evaluation from an endocrine approach has been pursued.

(4) The majority of women with dysmenorrhea manifests no ovarian failure as judged by progestational responses obtained by endometrial biopsies.

(5) Dysmenorrheic patients tend to excrete "androgenic" substances in greater quantities than those excreted by normally menstruating women.

(6) Endocrine therapy of functional dysmenorrhea *per se* is disappointing.

(7) Rational therapy of various endocrinopathies oftentimes results in the alleviation of menstrual pain.

(8) Probably functional dysmenorrhea results from no single endocrinopathic condition thus accounting for the various regimes of endocrine therapy employed clinically.

(9) Non-specific pharmacological effects of endocrine preparations must be appreciated before a more definite role can be assigned to organotherapy. Special note should be made herein of the newly established concepts relative to neuro-endocrine sympathies.

(10) The role of psychotherapy is ever present to mask the effectiveness of endocrine therapy.

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(11) Psychotherapeutic measures designed to correct inadequate mental preparation for adolescence and poor psychic orientation to menstruation enhances considerably the effectiveness of any form of therapy of functional dysmenorrhea.

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THE AIRPLANE, A POSSIBLE MEANS OF TRANSMISSION OF DISEASE*

W. P. JACKSON, Comdr., M.C., U.S. Navy Res.,
United States Naval Air Station,
Norfolk, Virginia.

To the great development of aviation in the last decade and all its advantages there are added two great disadvantages, i.e., its use as a deadly implement of warfare and the danger of conveying infectious diseases. The latter disadvantage is the subject of this discussion.

The diseases chiefly concerned are: cholera, plague, smallpox, typhus fever and yellow fever, but also malaria and dengue may well be considered. The incubation periods of these diseases are from two days to two weeks. For cholera it is two to five days; for plague two to six days; for yellow fever three to six days; for typhus fever five to twelve days; and for smallpox ten to fourteen days. The usual flight traveling time is less than a week so that a traveler can very easily become infected just before departure and break out with the disease a day or so after reaching the port of destination. Thus the human being may be an important carrier during the incubation period of serious disease.

To prove airplanes do transport mosquitoes and are thus a potential danger, four reports are recorded.

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F. G. S. Whitfield[1] of London reported in 1939 that, after examining 2,000 aircraft at Khartoum airport, 1,960 insects of 146 species were collected. Inclusion of the house fly would make a total of nearly 3,000. Of these 2,000 planes examined, 192 harbored infectious insects, excluding the house fly. These insects were fairly evenly distributed during the year, with slight increase from July to October. Among those insects were four species of Anopheles, six Aedes, including two of Aedes egypti taken at Molakai and four of Culex. Of fifty-two planes arriving at Kisumu from the north, about 50 per cent harbored insects, including the Culex and Anopheles mosquitoes.

Griffitts and Griffitts[2] reported that after their inspection of three types of airplanes operated in the Caribbean, namely the Fokker, Sikorsky, and Commodore, during July 23 to September 18, 1931, and from the 102 planes carefully inspected at Miami, twenty-nine mosquitoes, one Aedes egypti and twenty-eight Culex were captured. Twenty-four were caught on the Sikorsky, mostly in the front baggage compartment; four on the Commodore and

one on the Fokker. This difference may be due to the difference in prevalence of mosquitoes at ports of departure.

They continued their experiment by obtaining the Aedes egypti and turning them loose in the planes on three different flights from San Juan, Puerto Rico, to Miami, and were able to recover twenty-two of 100 let loose after traveling 1,200 miles in ten hours and ten minutes with three intermediate stops. They state that while certain types of airplanes carry mosquitoes, yet under average natural mosquito breeding conditions around airports, heavy infestation of aircraft would not be expected and only small numbers of mosquitoes would make the trip. However, even one infected Aedes might start an epidemic. They also state that while airplanes may and do transport mosquitoes, this mode of introduction of mosquito-borne disease is probably secondary in importance to importation of infected man.

The prevalence of insects in the cabins of aircraft varies with the site of the airdrome, that is whether it is on land or water and the distance it is from the shore. There are many places in the planes where mosquitoes may rest and not be disturbed by air drafts, such as under seats, baggage compartments, etc.

Recent investigations by the Pan-American Airways, reported by Cummings in 1938, indicated that interior disinfection of aircraft is insufficient because the mosquitoes and other insects may find safe harborage in the space between the outer and inner linings of the aircraft, or in the hollow wings. The exterior of aircraft offers many hiding places such as the space for retracted under-carriage and various grooves and rivet holes.

E. V. Welch[3] reported that after the inspection of all incoming aircraft at Miami from Central America, South America, and Mexico in 1938, of the 398 aircraft examined 187 contained dead and live insects of various species. One hundred and sixty-six of the 651 insects recovered were alive in spite of the fact that the planes were sprayed carefully with an insecticide one-half hour before landing, as required by regulations. Of the 651 insects found, forty-five were mosquitoes, forty dead and five alive. No Aedes egypti were found but Griffitts has reported the Aedes egypti captured and identified from planes coming from Cuba and other southern ports.

The transmission of insects by plane has thus been proven, and the short flying time indicates the ease with which an infected person may enter a port and in a few days come down with a serious insect-borne disease, thus being a potential danger of its spread.

Fortunately, up to the present time, there is not much indication that there has been a very serious increase in spread of disease by airplanes. However, Findley in 1938 strongly suggested this possibility in noting the recent spread of yellow fever from the endemic zones in West Africa, as far eastward as the Southern Sudan. In 1933, 1 per cent of the population had a positive yellow fever response to the mouse protection test, and in 1938, 21 per cent gave the same positive response.

Dr. H. L. Schlotthauer[4] reported four unusual cases following, in a period of a few weeks, the arrival at Muroc of a group of military planes reported to have come from South America by way of Panama. There were cases of acute illness produced by the bite of an insect previously unknown to residents of the Mojave Desert. The symptoms varied from urticarial wheals and fever as high as 103 degrees, occurring an hour after the bite. There was also swelling of the affected area, lasting as long as a week. In one case there was lethargy of two weeks' duration. All recovered after symptomatic treatment.

Specimens of these insects were taken and identified as paratriatoma hersutus barber, considered a member of the family of blood sucking vectors of American tripanosomiasis. These are commonly seen in South America.

Yellow fever should be given some special consideration because of its tremendous importance, the possibilities of its transmission and as a cause of devastating epidemics. For a long time, Aedes egypti alone was thought to be the sole vector of yellow fever, and by 1914 it appeared that the disease might be eliminated. The Rockefeller Board undertook to do this and sent General Gorgas to Africa. Since that time, however, twenty-two species of mosquitoes, certain flies, bed-bugs, ticks and cockroaches have been incriminated as yellow fever vectors. In the last fifteen years several epoch-making discoveries have followed one another in rapid succession concerning this disease. In 1927 Stokes, Africa. Since that time, however, twenty-two species of monkeys are naturally susceptible to the disease. Later, other animals were found susceptible and especially the English hedgehog. Certain species of

mice may be rendered readily susceptible to yellow fever.

In discussing this disease I wish to quote Dr. B. J. Lloyd:[5] "A method of preserving the virus in vitro indefinitely; the first method of attenuating the virus by passage through mice, rendering it not innocuous, but relatively so, for men and monkeys, but fatal to mice; development of a technique for immunizing against yellow fever by using attenuated (mouse brain) virus with immune serum; development of the mouse protection test, which reveals the protective power of the blood of an immune person who may have had the disease half a century or more ago; proof by cross-immunity tests of the identity of Central American, South American and African yellow fever by animal protection tests, and of Brazilian and African yellow fever by establishing cross-immunity, using separate strains of the living virus; the discovery of a dozen or more new vectors of the disease (mosquitoes); the discovery of 'jungle' yellow fever; the finding of immune individual monkeys in susceptible races of monkeys in the forests of South America; the finding of circulating yellow fever virus in the blood of monkeys in Brazilian forests; the discovery that yellow fever is transmitted to man in the absence of all known vectors (not in the absence of all mosquitoes); the development of a technique of bed-side laboratory diagnosis by inoculation of mice with blood from the patient; the use of the viscerotome in the post-mortem histo-pathologic presumptive diagnosis of yellow fever; and the attenuation of yellow fever virus by growing it in living tissue, and the use of this attenuated strain without immune serum in immunizing human beings against the disease.

"By a process of drying and freezing in vacuo, the virus of yellow fever may be preserved in glass tubes for years at ice box temperatures. By passage through mice which have suffered slight brain trauma, a neurotropic form of virus has been produced which is only rarely lethal for monkeys, and which has been used successfully with immune sera for immunizing both in man and animals. Before the development of this technique there had occurred thirty-six cases of yellow fever with six deaths as the result of laboratory infections. No cases or deaths have since been recorded in immunized laboratory workers."

Among these discoveries one of the most notable is the so-called mouse "protection test" of Sawyer and Lloyd[6] developed in 1931, following the discovery by Theiley in 1930 that white mice are susceptible to intra-cerebral injections of virus. This led to the most important epidemiological discovery concerning yellow fever. This was made by Soper who, making use of the above information, found a vast previously unknown reservoir of infection in the interior of South America which he defines as "yellow fever recurring in rural, jungle and fluvial zones in the absence of Aedes egypti and the absence of all the present known mosquito vectors, with the possible exception of Haemagogus."

Dengue fever is also transmitted mechanically by two types of Aedes, including the egypti and possibly two others, so that a dengue "reservoir" may be found in uninhabited jungle areas.

Malaria, in spite of accumulated knowledge concerning it, is said by Simmons[8] still to exceed all others in sapping the vitality and impeding the social, industrial and political progress of the inhabitants of many tropical countries. While we think of the Anopheles quadrimaculatus as the vector, there are many other vectors of the Anopheles group of malaria, at least eight and probably more, with their different modes and location of habitation. So, for the past twenty years there has been no decrease in malaria in the Canal Zone, although the anti-mosquito work still goes on as much as ever, indicating the difficulty of control in these tropical areas and the ease with which it may be spread by the airplane.

These recent discoveries have introduced the following new problems:

1. Search for still unknown vectors and hosts of the jungle infection;
2. Methods of protection of individuals exposed in those regions;
3. Precautions against the spread of these diseases from the jungle areas to Aedes infested centers. Such spread has been traced in a few outbreaks.

In addition, it may be well to quote Kolmer[9] here, who says; "Once any of these become epidemic in the United States it is possible and probable that our own various insects may become conveyors or vectors of the organisms from animal to man or man to animal." Bennett[10] has already shown that the common Jersey mosquito can transmit yellow fever virus to monkeys. Kolmer also listed a great variety of insects that carry diseases, all of which might be transferred by airplanes, but it is beyond

this paper to enumerate them here.

Draper[11] in 1939 called attention to the vast number of aliens arriving from various countries and mixing with the others at Croydon, the London terminal. The inadequately manned and consequently poorly controlled examination of the aliens leaves London "wide open", he says, for admission of these infectious diseases. At that time he said that only 20 per cent of the aliens were being examined.

Up to March, 1939, the International Sanitary Convention for Aerial Navigation[12] did not apply to service aircraft of any nation, so, unless they do conform to these regulations, preventable diseases may be spread by air, especially by aircraft moving from one command to another, in tropical and subtropical countries.

This danger was foreseen and resulted in the origin of the International Sanitary Convention for Aerial Navigation at the Hague in April, 1933, and has since been ratified by practically all the countries of the world. Each government has its own regulations regarding sanitary control of aviation, applicable at all official airdromes, for arrival and departure of foreign aircraft not permitted to land elsewhere. In case of a forced landing, the commander of the plane must notify the local authorities, and the crew, passengers and cargo must not leave the vicinity until permission from the local authorities is granted.

The fear of the introduction of yellow fever into India is so great that that government prohibits people coming from suspected yellow fever areas of Africa to enter India until nine days have elapsed since their departure from the affected area. India has even prohibited importation of yellow fever virus for research purposes. India, Egypt, and Iraq have virtually agreed to inform one another by telegram of any air passengers coming from a dangerous area.

The Health Organization of the League of Nations provides an international intelligence service which promptly informs health authorities throughout the world of the incidence of infectious diseases at various ports and airports.

Whitfield, because of the existence of yellow fever virus in the area involved, has advised against an airplane route from London, via Africa, to India and Australia.

As a point of consolation to the British, Massey[13] has pointed out to them that the possible spread of yellow fever to the British Isles is not likely to be a serious matter because of the climate. The Aedes egypti cannot establish itself permanently and breed further north than 40 degrees latitude, which is about the equal of the southern part of Spain. Against this assurance there is the possibility that some other vector might become infectious and be able to live and breed in that climate.

In the general procedure to prevent spread of infection, the countries concerned have adopted at least three precautions:

1. Systematic destruction of mosquitoes on all airplanes;
2. Vaccination of all flying personnel as soon as practicable;
3. Careful inspections of passengers to eliminate infected.

The Pan-American Airways System has adopted the Pan-American Sanitary Code which, in addition to this, agrees to present certificates showing the origin of the passenger's trip from the start to the end of the voyage, the listing of the localities visited six days prior to travel. The certificate of origin of passenger is not required if the passenger originates south of 30 degrees South latitude, unless he stops over for more than one day north of this area.

For effectual destruction of mosquitoes in aircraft, a suitable sprayer and insecticide are essential. As previously pointed out, this method is not yet perfect and probably will be improved from time to time. A suitable insecticide for aircraft has certain requirements. It must be:

1. Highly toxic to insects;
2. Innocuous to passengers;
3. Non-inflammable;
4. Non-corrosive and non-staining;
5. Stable in all climates and readily miscible with water.

For this water-soluble pyrethrum concentrate requiring dilution 10-14 times with water immediately before use is commonly used. About 30 cc. of 1:15 solution per 1,000 cubic feet of space is used. It is sprayed by a nebulizer. The plane is sprayed in the air about one-half hour before landing and the planes' ventilators are closed about ten minutes after the spraying. Further, the airplanes may be fumigated during the night and opened the morning prior to embarkation of passengers.

In addition to vaccination of the personnel as required, it is a very wise precaution for all pas-

sengers intending to travel by air through yellow fever areas also to receive the inoculation. One inoculation of the virus, which is issued in solidified form in ampules, is given in the deltoid region about fourteen days before expected date of arrival in the yellow fever zone. The contents of the ampule are dissolved in 1 cc. of cold sterile water and injected. Heat and alcohol will easily kill the virus. This protective inoculation has proven a most valuable preventive measure against yellow fever. Protection begins about a week after inoculation and is fully developed in 90 per cent of the cases in three weeks. The immunity lasts about two years and is equally effective against urban and jungle types of the disease. Since the personnel of the International Health Division was vaccinated, no case of yellow fever has occurred among them.

The third precaution is the most difficult and is as follows:

1. Medical inspection of passengers;
2. Isolation in hospital of infectious cases other than tubercular or venereal;
3. Surveillance of contacts during the incubation period of the disease;
4. Proper disposal of excreta on arrival;
5. Provision for a safe drinking water supply protected against mosquito breeding; the aircraft must be disinfected and emptied out and the tanks further disinfected before refilling with drinking water.

In addition, certain special measures are adopted regarding special diseases such as plague, cholera, typhus fever and smallpox. If any one of these is found or suspected, the following additional measures may be necessary:

1. Thorough cleansing of the aircraft;
2. Medical inspection of the passengers and crews;
3. Exclusion of any person showing symptoms of these diseases;
4. Inspection of personal effects if necessary.

In case of plague, the following additional measures are used:

1. Immediate disembarkation of the sick;
2. Surveillance of contacts and suspects for not over six days;
3. Disinfection and disinsectization of personal effects;
4. Deratization.

For cholera the same measures are used as for plague except that the period of surveillance is five days and the drinking water must be disinfected and also the containers emptied and disinfected. In addition, the unloading of fresh fish, shell-fish, fruit and vegetables is prohibited. This is true also if the airplane has come from a cholera-infested area. For typhus fever the measures are the same except for delousing and surveillance of twelve days. For small-pox, vaccination and surveillance for not more than fourteen davs.

In yellow fever regions, the airdome must be at an adequate distance from the nearest inhabited center, must be provided with a water supply protected against mosquitoes, and mosquito proof dwellings for aircraft crews and for the accommodations of passengers. Passengers and crews must be kept under surveillance for six days.

In case an airplane arrives from abroad, and a death occurs on board, the commander of the craft must notify the proper authorities. Infected aircraft, or those from infected areas, must not discharge passengers, crew or cargo till the medical officer has examined them and declared them free from infection.

SUMMARY AND CONCLUSION

1. It has been proven that the airplane can and does carry live insects, including some vectors of dangerous diseases.

2. The plane may very easily carry infected individuals if they are not discovered.

3. Fortunately no serious epidemics have yet actually been traced to airplanes as the means of spread, but there is accumulating evidence that the airplane has played some part already in spread of disease.

4. There is still much more information to be obtained regarding other possible vectors of serious diseases and the possibility of this transmission by airplane.

5. With continued increase of flying speed and opening up of new routes of travel these dangers increase.

6. Many of these routes are either in or across the tropics and sub-tropics where most of these diseases abound.

7. There is little assurance that our tropical or sub-tropical communities are under sufficient control to prevent widespread transmission of a disease like yellow fever once it enters that community.

8. This danger is even more apparent today, since there are now known to be other vectors of yellow

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and malaria fever other than the Aedes egypti and Anopheles quadrimaculatus.

In view of these established facts it is incumbent on the proper authorities to see that all possible means known to prevent the introduction of those diseases should be used, including especially:

1. A more widespread vaccination against yellow fever among those who travel in yellow fever regions when the products become available for common use.

2. More liberal vaccination against cholera in cholera infested areas.

3. More perfection in disinfecting airplanes.

4. More careful and thorough inspection of passengers and cargoes from planes coming from any of the infected areas. This last point is especially to be emphasized, because, as air travel becomes more and more popular and more and more within economical reach of the lower strata of society where these diseases are more prevalent, the dangers will become still greater.

Careful regulations under direction of thorough and competent health officers with adequate equipment and personnel may be the summing up of directions for control of a condition that has tremendous potentialities for spreading diseases and death.

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DISCUSSION

DR. HUGH H. TROUT, Roanoke: Sometime ago I heard Dr. Jackson read this very excellent paper and following same, I wrote to the Program Committee of the Medical Society of Virginia and told them that I thought Dr. Jackson could be persuaded to bring it here. They arranged with him to present it, and without my knowledge, put my name on the program to open the discussion on Dr. Jackson's paper. Now, I have never been up in an airplane, and I know absolutely nothing about them. I have never been a health officer and know very little about health matters, but I do know that Virginia has one of the best, if not the best, health officers in the United States. For these reasons, I have asked Dr. Riggin to take my place in opening this discussion, and I hope my action meets with the approval of the Society.

DR. I. C. RIGGIN, Richmond: I have known Dr. Jackson as long or longer than any other man in this audience, probably. We graduated in the same class, and it is a real pleasure for me to be up here and to tell you that I think Dr. Jackson has presented this subject most ably and has covered it in a most excellent manner. He has brought to your attention a matter to which I believe very few of us have given serious consideration. There is nothing that I can add to what he has said other than to carry it just one step further, and that is as to the part that the health officers in the respective states might play in this.

I believe that Dr. Jackson intimated that the problem might possibly become more acute from the standpoint of the spread of various diseases through the use of the airplane. To me it appears likely that the tremendous increase in the number of airplanes and in airplane use by the armed forces of this country is going to open up additional channels for bringing in these diseases. It is probably going to make the problem greater. It will make the problem greater because there will be more difficulty in keeping an accurate check on contacts. It might surprise you to know that we have had one instance in this State of a contact or suspect coming in on an airplane who might develop yellow fever. The procedure is that when an airplane arrives at a port, if the passengers have been in a community where yellow fever is prevalent but do not develop yellow fever before they arrive and there is no indication that they have it, wherever their destination may be the state health officer in that particular state is notified that those persons are coming within that jurisdiction. The state health

officer then notifies the respective local health authorities that those persons will arrive at certain destinations on a certain date and that they must be kept under observation during the incubation period. That has happened already in one instance in this State. The local physician who would be called by the person coming in is notified, so that if any developments occur which would indicate that the person who has arrived is becoming ill with any of these diseases, the local physician may have some indication as to what diseases the person has been exposed to.

I might say, Dr. Jackson, that I think this is a subject that should be presented to every physician in this country, because I believe there is the possibility of the spread of diseases within this country which we do not now fully realize. Dr. Jackson mentioned that yellow fever ordinarily would not occur above 40 degrees latitude—the latitude of Spain, for instance. If you take your world map you will see that some sections of this country are opposite Spain, and if you review your medical literature you will also know that we have had yellow fever in this country. We hope this weather will not keep up, but we might as well be living in the tropics now so far as feeling goes. I have also heard that there were some mosquitoes at Virginia Beach last night, although I did not see them.

I do think this is a paper that should be considered very carefully. Dr. Jackson, I personally am indebted to you for presenting this matter to this Society.

DR. JACKSON, closing the discussion: I have nothing in particular to say in closing except that I want to thank the gentlemen for the discussion.

Of course, we in the Service are vaccinating as nearly as we can all members of the Service, because we do not know what may happen in the next few months.

DIABETES INSIPIDUS FOLLOWING ENCEPHALITIS

WILLIAM R. JORDAN, M.D.,
and
W. RANDOLPH GRAHAM, M.D.,
Richmond, Virginia.

Diabetes insipidus produces immediate and daily inconvenience to the sufferer of such degree that medical aid is sought repeatedly until relief is despaired of or obtained. Disturbance of rest and irritability secondary to urinary frequency may impair health, as may polyuria through loss of vitamin B.[1] At any rate relief of the polyuria changes the patient's outlook and disposition favorably. Until recently the treatment with effective preparations of pituitary was inconvenient and costly and many patients were thus deprived of this relief. The satisfactory administration of powdered pituitary intranasally has lowered the cost and simplified the treatment so much that no patient with this disease need neglect it.

CASE REPORT:

A woman forty-nine years old, Case No. 240, was referred to us October 27, 1938, on account of thirst and polyuria. The present illness began with a fainting spell August 14, 1936. She remained unconscious for some minutes and was then put to bed. There were no prodromal symptoms save slight fever and malaise earlier in the day. After regaining consciousness she noted extreme weakness. During the next two weeks she remained in bed with delirium and high fever. No muscular paralysis was admitted, but the patient remembers little that transpired during this period. The fever subsided but recurred when she attempted to get up. During the next six weeks a slight drawing sensation behind the knees, considerable thirst and polyuria, and marked weakness and anorexia with intermittent fever were experienced. There was a loss of weight from her usual 200 pounds to 165 pounds during this period, but during the next eight months this was regained. After this acute illness, marked languor and lassitude together with stiffness and limitation of motion of the hands and knees, enough to cause serious difficulty in arising from a chair, persisted until we first saw her. The weakness and joint discomfort prevented her walking more than two blocks at a time. The thirst, dryness and polyuria remained severe until admission to the Retreat for the Sick hospital in October, 1938. She drank two gallons of water during the day and at least three quarts at night, but the urinary output for the day and night were about equal. The daily output was usually about twelve quarts. This varied with the intake which could be controlled to a slight extent, but was usually two and a half to four gallons in twenty-four hours. She voided seven to eight times in the day and four to five times at night, each voiding consisting of one to two quarts of urine.

The physical examination disclosed a fat, healthy

looking woman, sixty-seven inches tall, weighing 202 pounds. The teeth on the left side had been filed down because they had become too long in the last year or so. The right knee jerk and ankle jerk were less active than the contralateral reflexes. The temperature was 99.4 degrees and the pulse 84. The fingers were slightly swollen and showed limited motion, the knees some stiffness and crepitation. The examination was otherwise negative, including optic fundi and visual fields.

The patient voided 2000 cc. of urine at 7 P. M. and at 9 P. M. voided 1500 cc. This was entirely negative except for a specific gravity of 1.002. The postprandial blood sugar was 160 mg. on one occasion and 170 mg. on another. Only 0.2 per cent glycosuria was ever found. The uric acid was 4.8 mg. The hemoglobin was 75 per cent. The white count, blood smear and blood Wassermann were negative.

Twenty pressor units of pitressin (1 cc.) was given subcutaneously at 7 A. M. and 7 P. M. The urine output decreased to 3190 cc. the first twenty-four hours and to 1960 cc. the next day. The specific gravity rose to 1.015 each day. Pitressin jelly intranasally was tried next. At first ten pressor units was used twice daily, but the output remained somewhat high, 4560 cc. The applications were then used three times daily, and the output dropped to four quarts within twenty-four hours. Using fifteen pressor units intranasally at 2 P. M. and again at 9 P. M., she noted an output of three quarts during the day and two to five quarts at night. A week later her output increased to over two gallons, and we found that the jelly in that tube was cold and very stiff and that most of it dropped back into the throat and was swallowed. In general the jelly gave variable results, but usually the output was approximately five quarts.

The cost of the jelly was about $9.00 per month, which was a saving of $6.00 as compared to pitressin by injection. Nevertheless, the somewhat unsatisfactory results led us to experiment with the latter. By using 0.5 cc of pitressin (ten units) at noon and 8 P. M. the output was cut to 1200 cc. in the day and 1400 cc at night, a total of 2600 cc. Using only the 8 P. M. dose, to decrease the annoyance of nocturia, proved unsatisfactory. Using the noon dose every second day and the evening dose daily kept the output at three quarts in the day and one pint at night. Due to the expense the patient stopped the injections which she herself had been taking since beginning treatment seven weeks previously, but the urine output remained below six quarts even without pitressin in any form.

During this period general treatment with a balanced diet plus concentrated vitamin A, B and D preparations had been given. In addition 1 cc. of antuitrin-S had been injected intramuscularly twice weekly. The weight had remained about the same in spite of dietary recommendations. Cincophen was used a while for the arthritis. The joints became less stiff and sore, and the patient gained in strength and energy. She was encouraged to keep herself occupied with affairs at home rather than to follow her desire to avoid activity and responsibility. The failure to lose weight was only partially explained by a basal metabolic rate of minus 19 per cent. More careful instruction in the diet resulted in a loss of ten pounds in three months. Seven months after treatment was begun, the patient was much improved. She did much of her housework, set out fifty chrysanthemum plants one day and canned five quarts of tomatoes another day in addition to the usual household duties. Her joints were very much better and her attitude entirely changed. She had been depressed and emotionally unstable, but at this time she was cheerful and interested in her family and the activities going on around her. A total of twenty-one injections (21 cc.) of antuitrin-S and five injections (5 mg.) of estrone had been given in addition to the general supportive treatment and encouragement.

Throughout the summer and fall of 1939 she remained well. The joints caused no trouble save for limited flexion of the fingers of the left hand. Her appetite was enormous and the diet was discarded, resulting in a gain of ten pounds. The urinary output gradually increased from about six quarts a day shortly after the cessation of treatment with antuitrin-S to an average of fourteen quarts daily ten months later.

On January 3, 1940, her weight had reached 210 pounds, and her urinary output was two to three gallons daily, but she felt well otherwise. Nasal insufflation of posterior pituitary powder was instituted according to the method described by Rutledge and Rynearson.[2] Using the powder three times daily reduced the urine output to three and a half quarts a day, abolished nocturia, and cut the number of voidings to three or four each twenty-four hours.

On January 14, 1940, a few minutes after taking the powder, she experienced a sudden choking as if her windpipe was shut off so that she couldn't get her breath. She coughed steadily and her face became very red. The attack subsided in thirty minutes. That afternoon she suffered from sore knees and severe urticaria. After the evening dose she had a similar attack. The generalized pruritus lasted five days, and for ten days she noticed a wheezing and rattling in her chest. She took no powder during the next two weeks. Then she tried a very small dose with a similar, severe choking spell which necessitated her going outdoors for air. This time there was no itching or subsequent wheezing. After the above three doses, the usual decrease in urine volume did not occur.

An extract of the powder was made and she was gradually desensitized by hypodermic injections over a period of two months. The only ill effect was the formation of hard, tender lumps at the site of injection. Nasal insufflations were gradually increased in size and frequency until the patient was again regulated with four doses daily which are taken without trouble, discomfort or embarrassment. When last seen on April 30, 1941, she was still energetic, strong, cheerful and comfortable with little or no evidence of joint trouble. She had no nocturia and voided only three or four times a day, the total daily output varying from three to four quarts. The cost of this simple treatment is about $2.00 a month as opposed to the high cost, discomfort and greater inconvenience of pitressin by injection.

COMMENT: In view of the immediate sequence of events it seems likely that the febrile attack in 1936, diagnosed tentatively at the time as "grippe", was in reality encephalitis which involved the pituitary area and thereby induced the diabetes insipidus. The glycosuria of 0.2 per cent and the blood sugar of 170 mg. may have been a result of involvement of the sugar regulatory center in the same cerebral area or it may have been hepatic in nature due to obesity, as surmised by Newburgh.[3] At any rate it has proved to be so mild as not to be disturbing, even though the patient has failed to lose weight. The large bladder capacity seems worthy of note.

SUMMARY: A woman, fifty-one years old, apparently had encephalitis four years ago which left her with diabetes insipidus, arthritis, emotional upset, and marked languor and lassitude. General treatment was supplemented by injections of antuitrin-S and estrone. The diabetes insipidus was treated with pitressin hypodermically which on account of the cost was replaced by pitressin nasal jelly. The latter, due to its cost and somewhat unsatisfactory results, was in turn replaced by posterior pituitary powder intranasally with excellent results. However, anaphylactic reactions occurred until desensitization was accomplished. The daily use of pituitary powder maintains continuous desensitization so that further anaphylactic reactions are prevented.

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THE USE OF HEAT IN GENERAL PRACTICE*

BEN BOYNTON, M.D.,†
Norfolk, Virginia.

Heat is probably man's oldest remedy. The use of heat has been constant down through the ages and so today heat is one of the most commonly used physical measures in the practice of medicine. The fundamental principles underlying its use are quite simple; with proper understanding of them the results following the use of heat are far superior to those obtained where heat is used empirically.

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†Director, Department of Physical Therapy, Norfolk General Hospital, Instructor in Physical Therapy, Medical College of Virginia, Richmond, Virginia.

PHYSIOLOGIC EFFECTS:

Heat has two important physiologic effects:

1. INCREASE IN BLOOD SUPPLY.
2. SEDATION.

An increase in the blood supply to the part fol-

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lows the use of moderate amounts of heat given over a fairly long period of time. Intense heat given even for a short period may result in passive congestion rather than in the desired active hyperemia.

Sedation results from the fatiguing of sensory nerve endings in the skin, frequently referred to as counter-irritation. Relaxation of spasm in skeletal muscles also follows the use of heat and contributes to the relief of pain.

SOURCES OF HEAT:

The sources of heat may be classified as those producing:

1. SUPERFICIAL HEAT.
2. PENETRATING HEAT.

In the first group are those which produce heat on the surface with little or no increase in temperature in the underlying tissues. Here we find all the time-honored sources such as the sun, fire, hot stones, hot water, the hot water bottle, melted paraffin, and steam. Also in this group are some of the more recently developed forms: the electric heating pad, chemical heating pads, electrically heated blankets and jackets, infra-red lamps and generators, and so on.

In the second group are the electrical machines generating high frequency currents which are capable of producing a very distinct rise in the temperature of underlying tissues. The use of these currents dates back to less than half a century. There has been and continues to be a great deal of progress in the mechanical and practical aspects of this field.

ABSOLUTE CONTRAINDICATIONS TO THE USE OF HEAT:

1. ACUTE TRAUMA WITH EXTRAVASATION OF BLOOD.
2. INADEQUATE BLOOD SUPPLY, ACUTE OR CHRONIC.

In acute trauma with extravasation, the local application of heat will increase bleeding into the tissues; however, general application of heat may be required as a supportive measure to combat shock.

In sudden arterial occlusion or in advanced arteriosclerosis there is an organic insufficiency in blood supply; the local use of heat will increase the demand for blood; due to the pathologic condition this demand cannot be met so the net effect is to make a bad matter worse. On the other hand, application of heat elsewhere on the body may result in a reflex increase in circulation in the affected extremity as long as there is any unobstructed collateral circulation present.

Edema calls for the judicious use of heat. The blood supply in an edematous area is relatively poorer than in a similar normal area; therefore, the amount of heat used should be moderate and the period over which it is given should be long in order that an active hyperemia may have time to develop. For example: in the treatment of an arthritic knee where there is considerable effusion, gentle to moderate warmth applied for an hour is more effective that intense heat for twenty minutes. It is a safe rule that moderate heat over a long period is better than intense heat applied for a short period.

INDICATIONS FOR THE USE OF HEAT:

SUPERFICIAL HEAT:

- Arthritis of smaller joints
  - Hands and wrists
  - Feet and ankles.
- Common cold.
- Headache.
- Joint sprain.
- Muscle sprain (Myositis)
  - Neck
  - Shoulder
  - Back
  - Extremities.
- Superficial infections
  - Furuncles and abscesses
  - Painful incisions
    - Infected wounds
    - Perineal repair.
- Tenosynovitis.
- Toothache.

PENETRATING HEAT:

- Anuria.
- Angina pectoris.
- Arthritis.
- Bell's palsy.
- Bronchitis.
- Bursitis.
- Carbuncles.
- Cellulitis
  - Lymphangiitis and lymphadenitis
  - Salpingitis.
- Delayed union of fractures and fractures.
- Epididymitis.
- Myositis
  - Wry neck
  - Low back pain.

Neuralgia and neuritis.
Pneumonia.
Prostatitis.
Peripheral vascular disease
Thromboangiitis obliterans
Arteriosclerosis
Reynaud's disease.
Renal disease
Nephritis
Pyelitis
Cystitis.
Sinusitis.

The above lists are some of the more common indications for the use of heat. Obviously, many of the conditions listed under penetrating heat may be treated with superficial heat if the former is not available.

A brief consideration may well be given to the various sources of heat with particular attention to their virtues and their faults.

SUPERFICIAL HEAT:

The *electric heating pad* is perhaps the least effective source of superficial heat. This widely used device is subject to a great deal of variation in the amount of heat produced. Burns are not infrequent when the patient becomes too enthusiastic in its application. The possibility of electric shock is always present. Heat derived from this source is wholly superficial.

The ubiquitous *hot water bottle* is probably the most commonly used source of superficial heat. Its virtues and faults are too well known to require discussion here.

Hot water and *warm moist dressings* are frequently used sources of superficial heat. The universal availability of hot water makes this source a valuable one. Also, it is inexpensive, so that its lavish use does not constitute an economic problem. In applying warm moist dressings or in having the patient immerse the part in hot water a uniform distribution of heat is more likely than where dry heat is used. The buoyancy of water, in cases where the part is immersed, aids materially in the early recovery of active pain-free motion. The chief difficulty in the use of these agents is the rather constant attention required to keep the water at the proper temperature. Another limiting factor is tissue softening or maceration which may follow continuous application.

Chemical heating pads are a recent development and appear to be rather reliable. They are not likely to produce burns and they will maintain their temperature fairly evenly for several hours. Available in two or more different shapes and being independent of electrical current, the use of these pads is quite varied. It must be realized, however, that their heat is purely superficial.

Thermostatically controlled, electrically heated blankets and jackets are one of the very recently marketed sources and should find a large sphere of clinical acceptance. With good thermostatic control, an electric blanket would be most helpful in a variety of uses; for example, in the post-operative care of a patient the use of this device would assist materially in combating shock; in a sanatorium where it is desirable to have the patient sleep in the open, such a blanket to provide a light cover with dependable insulation from cold would prove effective; and, finally, provision of a constant temperature for cases with peripheral vascular disease is a field where the blanket should prove its worth. Electrically heated jackets are the clinical adaptation of the aviator's heated suit. Available in suitable shapes and sizes to conform to the various areas of the body, such a device provides a safe, even, superficial heat for long periods of time without discomfort to the patient.

Infra-red lamps and infra-red generators are readily available and provide a most excellent source of superficial heat. Many home devices may be used as efficient infra-red lamps: the common bathroom heater, a student's lamp with a high wattage bulb, or one of the numerous types of metal reflectors sold in drug stores for use with photoflood bulbs will function well when used at a comfortable distance for thirty to forty-five minutes twice or three times a day. In office practice or hospital work the larger infra-red lamps are preferable because of the higher intensity and generally greater adaptability. No infra-red lamp is capable of producing heat deep in the tissues. The lamps that give off considerable luminous radiation (tungsten filament) are richer in the slightly more penetrating infra-red radiations than are the infra-red generators (resistance coil elements). The latter source gives rise to radiations that are completely absorbed at the skin surface and, therefore, produces a greater sensation of heat.

Paraffin baths are a simple and easily constructed means of applying heat to any part that can be immersed. They consist of a kettle of suitable size

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plus enough paraffin, usually about eight pounds, to cover the part. The bath is placed over a stove and heated until all the paraffin is melted, then it is allowed to cool until a thin film of wax forms over the surface; at this time the patient immerses the part to be treated and keeps it in the bath for thirty minutes. A very marked hyperemia follows the use of such a bath and, although this hyperemia fades within an hour, the treated part continues to perspire freely for three or four hours. The paraffin is removed from the part immediately following the treatment and is returned to the bath; thus the same wax is used repeatedly.

With the exception of the electrically heated blankets and jackets, all the devices named above are readily available and may be successfully used in the home as well as in the hospital or office. For the most part they are not expensive to obtain or to use; however, to get the most efficient response from their use they should be as definitely prescribed as any other form of medicine. The patient should be told what form of heat to use, what intensity of heat, the length of each treatment, and how often to repeat the treatment.

PENETRATING HEAT:

The original type of apparatus for producing high frequency currents was the *spark-gap diathermy machine*. The heat derived from such a machine is more intense at the surface and progressively less in the deeper tissues, but, withal, a very definite increase in deep tissue temperature results. The main disadvantages in this type of deep tissue heating are the time and skill required to apply the electrodes directly to the skin, and the fact that the deep heating in obese patients is not as great as in thin individuals because of the thick layer of adipose tissue in the former.

Short wave diathermy, making use of the vacuum tube instead of the spark-gap, is the modern method of supplying medical diathermy. It is called short-wave diathermy because of the fact that the wave-lengths generated are shorter than those used in spark-gap diathermy. There are two principal ways in which to apply short-wave diathermy: one is by utilizing an electrical field—using pads, cuffs, or air-spaced electrodes; the other method is to make use of an inductance cable wrapped around the part or laid over the part in the form of a flat disc or pancake. This latter method utilizes the electromagnetic field which is set up around the cable by virtue of the fact that an electrical current of high voltage and high frequency is flowing through the cable. Either method produces satisfactory deep tissue heating if properly applied. The inductance cable is simpler to use and the likelihood of improper distribution of heat is less than with pads or cuffs. Burns are possible with all forms of diathermy machines.

The employment of medical diathermy in the home is not a common practice because of the difficulties involved, namely, the size and weight of a machine, the special care and training necessary for its intelligent use, and the dangers attendant on its use where constant supervision is not possible.

In a well-equipped physical therapy department there are other sources of heat in addition to those already listed; however, time does not permit of an extended consideration of this phase of the subject.

SUMMARY AND CONCLUSIONS.

Heat is one of the most commonly used physical measures in the practice of medicine. The physiologic effects of heat are: (1) an increase in blood supply to the part, and (2) sedation due to the relief of pain. The sources of heat fall into two large groups: (1) those which produce superficial heat, and (2) those which produce penetrating heat. The only absolute contraindications to the use of heat are acute trauma with extravasation of blood into the tissues and conditions where there is an organic insufficiency in blood supply. Heat may be used with benefit wherever there is:

INFLAMMATION,
INFECTION,
TISSUE REPAIR in progress,

so long as it is used with care and understanding of its physiologic effects. Heat is never a complete therapeutic regime when used alone but it must be considered as a *valuable adjunct* to other forms of treatment. The choice of the type of heat to be used depends primarily on the condition to be treated; secondarily, on the availability of an effective source. Finally, heat should be definitely prescribed; the patient should be told

What form of heat to use,
What intensity of heat to use,
The length of each treatment, and
How often to repeat the treatments.

Norfolk General Hospital.

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REPORT OF A CASE OF NASAL MYIASIS DUE TO A BOT FLY LARVA (*Cuterebra* sp.)

R. G. BEACHLEY, M.D.,
Adjunct Professor of Public Health Practice, George Washington University, Washington, D. C., Arlington, Virginia,
and
F. C. BISHOPP, PH.D.,
Assistant Chief, Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture, Washington, D. C.

A white woman, aged 36, reported that while working in the garden of her home in Arlington County, Va., about noon on July 8, 1941, she suddenly felt a sharp sting as though by an insect in her right nostril. The sting was so painful that she gave a sudden sharp inhalation which was followed by a profuse watery secretion from the nose and some coughing.

About 7:00 P. M. that evening a severe tickling in the nose was followed by a paroxysm of sneezing. This continued for twenty-five or thirty minutes. There was a little discomfort during the next two days, followed by slight pain and a feeling of pressure in the right side of the face, combined with an intermittent desire to sneeze. There was, however, comparatively little actual sneezing.

On Saturday, July 12, she went to the ocean and the salt air gave noticeable relief during the three-day stay. The pressing sensation then returned and lasted through July 17.

On July 18 violent pains were felt in the right side of the face, extending into the throat, shoulders, and back. A cold compress gave temporary relief. The same day she consulted her family physician. He referred her to a nose and throat specialist who made an examination of the nasal passages which he reported as negative for any foreign substance. At this time the nasal passages were irrigated. On July 19 she again visited the nose and throat specialist and again the nasal passages were examined and irrigated; no foreign substance could be found.

At this time it was thought that the pains in the head might be caused by an infected molar tooth and she was referred to a dentist on July 19 for x-ray and further examination. An x-ray of her teeth revealed no impacted wisdom tooth or other pathological condition. While in the dentist's office she felt a tickling in the region of the antrum and had a violent paroxysm of sneezing and expelled what appeared to be the larval or maggot stage of an insect. It was alive when brought to the senior author on the same day.

Between July 19 and 24, the patient improved insofar as the pain in the head, back, and face was concerned, but the uncomfortable feeling of pressure continued. She complained of a throbbing sensation in the region of the antrum when she leaned over. About July 22 an x-ray was taken of the head which showed some cloudiness in the region of the antrum and ethmoid sinus. On Thursday, July 24, about 7:00 A. M., she had a severe hemorrhage from the right nostril which was followed by several smaller hemorrhages over the next four days. The blood was not examined for larvae. The uncomfortable feeling over the antrum and right side of the face diminished with each hemorrhage. The patient was not accustomed to smoking, but on July 26 she smoked several cigarettes and this seemed to give her some relief.

The specimen expelled was a grayish, spiny larva about 6.5 mm. in length by 1.4 mm. in width (see Fig. 1). It was in the first larval stage but had

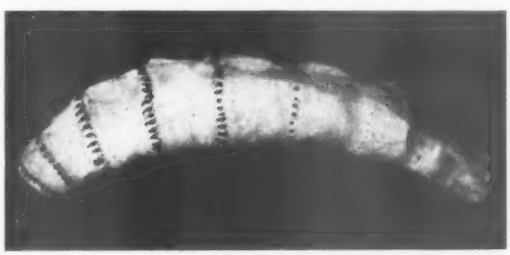

Fig. 1.—*Cuterebra* sp. Lateral view

grown so that it was about ready to molt to the next larval stage. It was submitted to Mr. E. F. Knipling, of the Bureau of Entomology and Plant Quarantine, a specialist in dipterous larvae, who identified it as belonging to the genus *Cuterebra*. This group of large flies, commonly known as rabbit bots, is parasitic in the larval stages on rabbits, squirrels, mice, and other rodents. Little exact in-

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formation is published on the biology of flies of the genus *Cuterebra*. The larvae usually occur singly as subdermal parasites in a cyst, with an external opening in the skin for breathing. It is usually supposed that these flies deposit eggs on the hair of the host, or around the nest, and that they hatch and the larvae burrow directly through the skin, or are swallowed, and ultimately reach the subdermal tissues. Inquiry and examination of the premises where the infestation occurred elicited the information that wild rabbits, squirrels, chipmunks, and field mice were present, some of them being seen in the yard.

A distinctly related species, the sheep nose bot (*Oestrus ovis* L.) not infrequently infests the eyes and nose of man. This species deposits masses of minute active larvae.

This is the first instance known to us in which one of the bots of the genus *Cuterebra* has infested man.

INFECTIOUS DISEASES AS A CAUSE OF DIABETES INSIPIDUS

HOWARD A. HOFFMAN, M.D.,
St. Elizabeths Hospital
Washington, D. C.

The occurrence of diabetes insipidus on an inflammatory basis has been progressively increasing. In an admirable review of the literature, Fink[1] found that of 107 cases of diabetes insipidus 63 per cent were due to tumor and 25 per cent to inflammatory disease, the remainder being either post-traumatic or undetermined.

The infectious types lend themselves to division into four main diseases—encephalitis, syphilis, tuberculosis and actinomycosis.

The increasing frequency of the incidence of diabetes insipidus in association with *epidemic encephalitis* is attested to by the reports of Hall,[2] Whitehead and Darley,[3] Moore and Cushing,[4] *et al.* In the brain of ten cases of epidemic encephalitis studied by Eaves and Croll, it was found that those cases at necropsy which showed complete chromatolysis in the hypothalamus had not been, in clinical retrospect, associated with diabetes insipidus; while those brains in which only post-encephalitic inflammatory reactions were detected had come from patients with diabetes insipidus. This led many investigators[3] to believe that the condition is due to an irritative lesion in that part of the brain, rather than to a destructive lesion. This may be explained on the basis that the hypothalamus exerts an inhibitory effect on pituitary gland which is accentuated by a slight lesion but destroyed by a severe one. It is conceivable that post-encephalitic changes may include a fibrosis of glial tissue surrounding the hypophysis; but there is not much evidence in support of this.

Roehm[5] has reported a case wherein, on the seventh day after vaccination, polyuria and polydipsia commenced suddenly, together with fever, headache, chills, irritability, emotional rages on the least provocation and markedly exaggerated tendon reflexes. Other cases of post-vaccinal encephalitis with urinary symptoms have occurred,[6] requiring that this form be considered as an etiologic contribution.

Syphilis, congenital or acquired, is an important etiologic factor. In Fink's analysis,[1] 13 per cent of all the cases were of luetic orgin. These form more than half of the cases on an inflammatory basis. According to Hall,[2] one-third of all cases of syphilitic meningitis may be expected to show polydipsia and polyuria. In his series, 12 out of 36 did.

In syphilitic cases, the type is either a gumma in the floor of the fourth ventricle, in the pituitary, or in the hypothalamus—or it is a process which sets up a basal meningitis or endarteritis with concomitant connective tissue proliferation.[7] With more accurate methods of diagnosis and more frequent employment of earlier and more effective treatment, this branch of the infectious etiology is disappearing.

Tuberculosis has been encountered in about 5 per cent of the instances of diabetes insipidus. The lesion appears to be a basilar tuberculous meningitis associated with a caseous nodule or tuberculoma in the infundibulum.[8] Often, in tuberculous meningitis with nodular tubercles in the brain, polyuria may be the only symptom.[1] The pathogenesis of the effect of such a lesion on water balance may be regarded along the same lines as those considered under encephalitis.

Finally, *actinomycotic abscesses* occurring in the

neighborhood of the pituitary have been reported to occur occasionally in true relationship to diabetes insipidus.[1] This suggests a predilection on the part of the ray fungus for the base of the brain. The inflammation resulting from this invasion inhibits the pituitary from exerting its normal checking action on the function of the kidneys.

It should be noted that diabetes insipidus may appear during convalescence from any of the acute infectious diseases—e.g., measles.[9] However, these are transitory and of little importance.

In the course of this discussion, numerous sites of pathology and varied mechanisms of disturbed function have been alluded to, but none dogmatically accepted. This is in conformity with the present knowledge of the subject. The evidence from the standpoint of the morbid anatomist and experimental pathologist is that the pathologic lesions associated with diabetes insipidus are varied in character and distribution and are related to an interdependent pituitary - infundibulum - hypothalamic complex, rather than any single factor.

This physio-pathology in the brain must ultimately affect the kidney. Yet it must be remembered that the function of the kidney is under the influence of *three* factors—viz., (1) the kidney itself and its autonomic nerves, (2) a vegetative center in the tuber cinereum or hypothalamus, and (3) a pituitary hormone. In regard to the role of infectious diseases in this etiologic problem, it is interference with the second, and possibly also the third, which appears to be responsible for production of the symptom-complex-diabetes insipidus.

SUMMARY

Infectious diseases are associated with one-fourth of cases of diabetes insipidus. In decreasing frequency, these are encephalitis, syphilis, tuberculosis, and actinomycosis—oddly enough, a viral, a protozoal, a bacterial and a fungal disease, respectively. The encephalitic factor is increasing, the syphilitic decreasing, the tuberculous constant, and the actinomycotic rare. Pathologically, these all produce characteristic inflammatory lesions in the brain—in or near the hypothalamus, infundibulum or pituitary body. Pathogenetically, all the lesions act similarly to the end that they cause a change in the influence of the cerebral neuro-humeral factors over renal function.

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SELECTED CASE REPORT OF MATERNAL DEATH

By THE MATERNAL HEALTH COMMITTEE,
MEDICAL SOCIETY OF VIRGINIA

CASE REPORT

A 24-year-old white multipara (parity not stated) was not seen by a physician until after six hours of labor at term. Membranes ruptured spontaneously just before the arrival of a physician. A vaginal examination was done without gloves. Four hours later the pains were hard and another vaginal examination was done. A transverse presentation with prolapsed arm was then diagnosed, and another physician was called in to administer an anesthetic. Under chloroform anesthesia, an internal podalic version and breech extraction were accomplished with considerable difficulty. A large amount of force was required for delivery of the after coming head. The condition of the baby at birth is not stated, but we presume it was stillborn.

When the patient regained consciousness after the anesthetic, she complained of severe abdominal pain. The pain increased in intensity and *two days* later the patient was sent to a hospital.

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The patient was admitted to a hospital with the diagnosis of peritonitis and ruptured uterus. Blood cultures—negative. Lochia culture—staphylococcus, B. coli, and non-hemolytic streptococcus. A stormy course followed and a septic temperature persisted. Sixteen days after admission a psoas abscess was incised and drained, and five days later a subdiaphragmatic abscess was drained. The patient was given transfusions (2400 cc.), sulfanilamide, and sulfathiazole. The course continued steadily down hill and the patient died six weeks after delivery.

Autopsy showed a ruptured uterus, generalized and pelvic peritonitis, subdiaphragmatic abscess, and fecal matter in the abdominal cavity from a rent in the bowel at the hepatic flexure.

COMMENT

It is felt that this is an obstetrical death and a preventable death. One factor contributing to the death is the absence of prenatal care apparently due to neglect on the part of the patient and her family. (There is no information before the committee which shows that prenatal care was not available.) Prenatal abdominal palpation would have shown the abnormal presentation so that arrangements for hospital confinement could have been made. (There is no evidence that a hospital was not accessible.)

The wisdom of attempting a version and extraction in the home for a transverse presentation may be seriously questioned. Version in transverse presentation, particularly sometime after the membranes have ruptured is often the most difficult and dangerous of obstetrical operative procedures. Under these circumstances the technical difficulties in the procedure are enormous and danger of a rupture of the uterus is an ever present hazard.

The presence of severe abdominal pain following such a procedure practically established the diagnosis of a ruptured uterus. An early removal of the ruptured uterus with an intraperitoneal application of a sulfonamide drug, combined with early replacement of blood loss by transfusions may have offered this individual a better chance for survival. The mortality in ruptured uterus increases with each passing hour, and after forty-eight hours have elapsed and peritonitis has developed operative intervention, except for the drainage of pus accumulations, is usually futile. Traumatic rupture of the uterus during labor is one of the most dangerous accidents of labor and always carries a high mortality, for even if the patients survive the immediate shock and hemorrhage, they frequently succumb later to infection, as did the patient under consideration.

Certainly after admission to the hospital, it seems that everything possible was done in an effort to save this patient. One member of the committee felt that the patient should have had a hysterectomy after admission to the hospital (two days after delivery), but the other members of the committee seem to feel that hysterectomy at that time, with obvious peritonitis present, would not have changed the outcome.

In summary then, this white multipara died from an infection secondary to a ruptured uterus, which was produced by a version and extraction on a transverse presentation. Antenatal examination or examination at the onset of labor would have detected the transverse presentation and would have indicated a hospital delivery. The diagnosis of a ruptured uterus shortly after delivery would have indicated an immediate hysterectomy. Because of these failures, it is felt that this should be classified as a preventable death.

Correspondence

Do You Know Your Nurse Maid?

University, Virginia,
November 29, 1941.

TO THE EDITOR:

Several physicians here have observed the following article which appeared in a relatively inconspicuous place in the *Charlottesville Daily Progress* and we feel greater publicity should be given it. One of the newspaper men of the Associated Press is going to publicize it pretty widely in the lay press, and I think the *Virginia Medical Monthly*, the *Southern Medical Journal* and the *Journal of the American Medical Association* will be glad to receive such a notice as this.

LAWRENCE T. ROYSTER, M. D.

CHIPS ABOUT CHARLOTTESVILLE

By the Chipster

Unbelievable as the following may sound, it came to us from such a source that we cannot doubt its authenticity.

If we failed to publish it, we would feel like criminals for not passing it along in the hope that

the family concerned will find out about it before it is too late.

It happened on a Charlottesville bus. A woman overheard two housemaids talking.

"How do you like your new job?", one asked.

"Oh," replied the other, "it's all right but they have a kid that cries all the time. I don't know what to do with it."

"Ha," said the first, "I do. They have one at my place too. But when it starts bawling, I just hold it over the gas range with the gas turned on but not lit. When it gets drowsy, I put it back in bed. That takes care of that".

One doesn't have to be a doctor to know that this procedure is bound to have a bad effect on the child —perhaps permanently injure the heart.

The lady who overheard the conversation is not a detective. So she did not get off the bus to follow the maid. She doesn't know in whose home she works.

Miscellaneous

Keep Working, Keep Singing—America.

It is difficult for most of us, as we go about our daily tasks, to realize how grave the challenges are that face our country—how vital the problems that must be solved, if we are to preserve those things we hold most dear—those things that generations have worked, fought and died for.

Yet each passing month underscores these grave realities.

And each passing day must find us more firmly resolved to preserve our hard won freedoms—come what may.

To this end America—and each of us individually —must accept a responsibility and an obligation as great as that which our forefathers faced during every critical period in the history of our country.

We must bend every nerve and sinew to produce.

We must be able to pit our power to create and build against the power of those who would tear down and destroy.

We must be prepared to match the physical strength of our system of free enterprise against the power of every other system.

These are the forces that created our freedoms—

the gospel of WORK
the doctrine of FAITH
the spirit of LIBERTY
the GENIUS that is AMERICA.

—they, alone, will preserve these freedoms now.

This country of ours didn't just happen. Generations of men and women worked here—free men—free women. With determination in their hands and songs in their hearts they built something.

Work blasted and hammered and axed a path through the wilderness. Work raised to manhood a new race of pioneers. Work tore from the raw rock the metals of industrial greatness. Work met and conquered the prairie blizzard and the desert sun. Work lifted the path of the iron horse across the High Sierras and flung rafters of steel against the sky.

Work and the will to work created the greatest nation on earth—and a way of life more bountiful and more generous than any other the world has known.

Work—the work of free men—of men and women who sing as they work as free men should—that was our past.

Today the battlefields on which our freedoms must be preserved include the assembly lines of Detroit—the blazing mills of Pittsburgh—the laboratories that seek and find—the harvest fields of the great Northwest—the plains of Texas—the railways that web the continent—the highways on which the nation moves.

Every man—every woman—every corporation in America has work to do. It is the sum total of this work—and the extent to which it is carried through —that will measure the future American way of life.

But—something more must follow along. With this work must flow the spirit of America. In this work must be the heart of America. Out of this work must come the free song of America.

. . . and so the House of Squibb, in its radio program from coast to coast says to the nation:—Keep Working . . . Keep Singing . . . America.

To remind America of its great responsibility—of its sacred heritage—of the necessity to leave no stone unturned to strengthen the character and defensive power of this our nation.

We hope that you who are a part of the House of Squibb will listen to these programs whenever you can. We hope you will believe in them and become a part of them. And if you believe in them, we hope you will go out and speak about them . . .to

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your friends, the doctors and druggists . . . to every one you meet.

And we hope that you and they will be a continuing part of this program, raising your voices too, with strength and with conviction, saying:—

KEEP WORKING—KEEP SINGING—AMERICA.

LOWELL WEICKER,
President, E. R. Squibb & Sons.

Public Health Statistics

I. C. RIGGIN, M.D.,
State Health Commissioner of Virginia

The report of the Bureau of Communicable Diseases of the State Department of Health for November, 1941, compared with the same month in 1940 and for the period of January through November, 1941, compared with the same period in 1940 follows:

	Nov. 1941	Nov. 1940	Jan.-Nov. 1941	Jan.-Nov. 1940
Typhoid and Paratyphoid Fever	52	36	318	258
Diarrhea and Dysentery	252	93	5,453	1,808
Measles	403	165	35,119	3,759
Scarlet Fever	317	294	1,474	1,584
Diphtheria	188	128	650	621
Poliomyelitis	29	47	148	230
Meningitis	5	6	97	69
Undulant Fever	3	2	15	22
Rocky Mountain Spotted Fever	0	1	32	46
Tularemia	2	0	22	40

VIRGINIA'S PNEUMOTHORAX PROGRAM

The pioneer efforts of the State Health Department to develop a statewide Pneumothorax Program in July, 1938, have resulted in the establishment of fifty-eight stations, manned by local physicians for the care of indigent pneumothorax patients.

No attempt has been made to start cases in the field, as it is believed that this procedure should be inaugurated in the sanatoria where special facilities and skilled staffs are better able to determine and institute the proper treatment for each individual patient. Approximately 600 patients are being treated by this service annually. This represents a real financial saving to the State, since a large percentage of these patients otherwise would be compelled to remain in the sanatoria, occupying beds badly needed for new cases.

In addition to the pneumothorax service, arrangements are made to care for major chest surgery at the two State-owned general hospitals and at certain private hospitals equipped to do this type of work. All candidates for surgery undergo preliminary study in the sanatoria before being admitted to the general hospital. This policy has two desirable features: first, the physician has the benefit of the advice of the internist; second, unsuitable cases are weeded out, thus saving the expense of admittance to the general hospital.

The development of this program has given new momentum to tuberculosis work in Virginia. It has made available the most modern, scientific, and hopeful therapy yet found for a large group of tuberculous individuals. From a public health standpoint, it has meant the conversion of positive to negative sputum, thereby reducing the number of infected contacts. Economically, it has meant a greater turn-over in sanatoria beds. For the patient, it has meant care at one of the local stations, shorter periods of sanatorium care and earlier return to family and work.

Every effort has been and will continue to be made by the State Health Department to limit this type of service to those unable to pay for it by a private physician.

Woman's Auxiliary to the Medical Society of Virginia

President—MRS. E. LATANE FLANAGAN, Richmond.
President-Elect—MRS. H. W. ROGERS, Norfolk.
Recording Secretary—MRS. HAROLD W. POTTER, Hilton Village.
Corresponding Secretary—MRS. A. S. LILLY, Richmond.
Treasurer—MRS. REUBEN F. SIMMS, Richmond.
Chairman, Press and Publicity—MRS. HENRY M. SNEAD, Petersburg.

Wythe Auxiliary.

A meeting of the Woman's Auxiliary to the Wythe County Medical Society was held November 7th, at the home of Mrs. J. F. Repass, president, who presided. A report of the State meeting at Virginia Beach was given by Mrs. Erwin S. Berlin. We were most fortunate to have with us, again, our State president, Mrs. E. Latane Flanagan, who explained very interestingly the Constitution and By-Laws and the duties of the various officers. It was decided to bring a speaker on nutrition to Wytheville in the near future.

The officers of the Auxiliary are: president, Mrs. J. F. Repass; vice- president, Mrs. C. A. Michaels; treasurer, Mrs. B. L. Holladay; recording secretary, Mrs. Erwin S. Berlin; corresponding secretary, Mrs. C. D. Moore; parliamentarian, Mrs. Joseph E. Barrett; and historian, Mrs. Charles Fox Graham.

MRS. ERWIN S. BERLIN,
Recording Secretary.

Petersburg Auxiliary.

The Petersburg Medical Auxiliary entertained the members of the Camp Lee Medical Auxiliary at tea on Tuesday, November 25th, from 4 to 6 o'clock in the home of Dr. and Mrs. Wright Clarkson. Mrs. Clarkson and Mrs. Henry M. Snead poured tea. The house was beautifully decorated in chrysanthemums and each guest was given a corsage.

The Auxiliary volunteered as a group and individually to serve in defense work, the members making application for instructions in First Aid, which classes are expected to commence immediately.

MRS. J. E. HAMNER,
Chairman, Press and Publicity.

Mid-Tidewater Auxiliary.

The quarterly meeting of the Woman's Auxiliary to the Mid-Tidewater Medical Society was held on October 28th at the home of Mrs. E. L. W. Ferry at Millers Tavern. Mrs. Hawes Campbell, president, presided. After a short business meeting and reports from the various chairmen, Mrs. Flanagan, State president, gave much valuable information through her well-selected topic "This Job of Ours". Mrs. Reuben F. Simms, State treasurer, was also a guest and gave a report on the State meeting at Virginia Beach. Mrs. Campbell presented the Auxiliary with a silver vase which was won for the largest paid-up membership.

The following chairmen were appointed: Membership and Hygeia, Mrs. W. S. Cox; and Publicity, Mrs. Paul Pearson.

Following the meeting, the ladies were guests of the doctors at a turkey dinner.

(MRS. PAUL) VIRGINIA MCG PEARSON,
Publicity Chairman.

Book Announcements

Books received for review are promptly acknowledged in this column. In most cases, reviews will be published shortly after the acknowledgement of receipt. However, we assume no obligation in return for the courtesy of those sending us the same.

Immunology. By NOBLE PIERCE SHERWOOD, Ph. D., M.D., F. A. C. P., Professor of Bacteriology, University of Kansas, and Pathologist to the Lawrence Memorial Hospital, Lawrence, Kansas. Second Edition. St. Louis. The C. V. Mosby Company. 1941. 639 pages. Illustrated. Cloth. Price $6.50.

The Toxemias of Pregnancy. By WILLIAM J. DIECKMANN, M. D., Associate Professor of Obstetrics and Gynecology, The University of Chicago; Attending Obstetrician, The Chicago Lying-In Hospital and Dispensary; etc. St. Louis. The C. V. Mosby Company. 1941. 521 pages. With fifty text illustrations and three color plates. Cloth. Price $7.50.

Synopsis of Genitourinary Diseases. By AUSTIN I. DODSON, M.D., F.A.C.S., Richmond, Virginia. Professor of Genitourinary Surgery, Medical College of Virginia; Genitourinary Surgeon to the Hospital Division, Medical College of Virginia; Urologist to St. Elizabeth's and St. Luke's Hospitals; etc. Third Edition. St. Louis. The C. V. Mosby Company. 1941. 302 pages. Cloth. Price $3.50.

Synopsis of Allergy. By HARRY L. ALEXANDER, A.B., M.D., Professor of Clinical Medicine, Washington University School of Medicine, St. Louis; Editor of The Journal of Allergy. St. Louis. The C. V. Mosby Company. 1941. 246 pages. Cloth. Price $3.00.

I'm Gonna Be A Father! By BOB DUNN (with a little assistance from his wife). Philadelphia. David McKay Company. 1941. Sixty-eight pages of cartoons. Cloth. Price $1.00.

Treatment of The Patient Past Fifty. By ERNST P. BOAS, M. D., Associate Physician, Mount Sinai Hospital, New York City; Chairman, Committee on Chronic Illness, Welfare Council of New York City; etc. The Year Book Publishers, Inc. Chicago. 1941. 324 pages. Cloth. Price $4.00.

The March of Medicine. New York Academy of Medicine Lectures to the Laity, 1941. New York. Columbia University Press. 1941. xiv-154 pages. Cloth Price $2.00.

Health Education in Relation to Venereal Disease Education, by MAURICE A BIGELOW. A Report on a recent important cooperative project between the U. S. Public Health Service and the American Social Hygiene Association. 32 pages, price 25 cents. Publication No. A330.

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WYNDHAM B. BLANTON, M. D.
Editor

AGNES V. EDWARDS
Business Manager

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Editorials

P.A.B.A. and Achromotricia

P. A. B. A. is the streamlined way of writing paraaminobenzoic acid, a member of the Vitamin B family. Achromotricia is a polysyllabic word for the loss of hirsutic pigment, a state of affairs commonly known as "turning gray". P. A. B. A. and achromotricia seem to be related.

The hopes of a great army of regretfully graying Americans were raised by Dr. B. F. Sieve's recent claims before the Society for Experimental Biology and Medicine at its New York meeting. Basing his conclusions on the experience of treating 300 persons with this new drug, he reported dramatic restoration of color to the hair when doses of from 100 to 600 mgm. daily of P. A. B. A. were given. He noted also that during such therapy pigment returned to the lesions of vitilego, that libido took a jump, sterility and impotency retreated, and even the asthmatic wheezed less often. If all this be true, public kudos may ultimately go to P. A. B. A., and the reigning house of the sulfonamides may tremble for its supremacy in popular esteem. It may well be that the desire for the preservation of pigment in hair and skin, the sex urge, and the procreative faculty takes precedence in the minds of mortal men and women over their desire for life itself.

Make Haste Slowly

A SYNTHETIC estrogen of high potency, low toxicity, orally effective, has long been a desideratum of physicians interested in the therapy of the menopause, amenorrhea, migraine and other related deficiencies. Because of the published accounts of the clinical efficacy of *stilbestrol*, doctors were beginning to believe that they might shortly lay aside the hypodermic syringe in favor of a cheap and potent tablet. While they hesitated for better knowledge of optimum dosage, toxic effects, and comparative strength of the product with the known natural estrogens, *Hygeia* proclaimed the virtues of the synthetic estrogen, and the *Readers Digest* raised the hopes of thousands of menopausal women by a glib account of its virtues. It is to be hoped that physicians who yield to the importunities of patients whose knowledge is derived from the public press will bear in mind the toxic manifestations of this synthetic drug when used in large doses and will remember that the results of wide clinical usage have yet to be assembled and evaluated.

Popsy

BY a happy conspiracy of the Flexners, father and son, we have now a definitive biography of William Henry Welch. The senior author, Dr. Simon Flexner, was first a pupil, then an assistant of Welch's in pathology at the Hopkins and later as Director of the Rockefeller Institute for Medical Research enjoyed a lifetime association with him. The junior author, James Thomas Flexner, formerly a journalist, will be remembered for his recent popular book, *Doctors on Horseback*.

The Flexners in this book, unemotional and restrained in its language—possibly in this way best reflecting the character of its subject—bring us step by step, steadily but never tediously, from the unostentatious entrance to the equally unostentatious exodus of this commanding figure in the heroic age of American medicine. We follow the motherless child of a country doctor through the resolution of his adolescent conflicts, his college career at Yale, his medical education at the College of Physicians and Surgeons in New York, his *wanderjahr* in Europe, to his decision to make pathology a life-long profession. We learn of his early struggles with ideals and ambitions in New York City where he established the first laboratory of microscopic pathology in this country, his research in pathology there and in Europe, and his call to the professorship of pathology in the then new Johns Hopkins Medical School. We are given an insight into the tremendous range of activities into which his vast energy was poured from that time on. He presided for years over the Board of the Rockefeller Institute for Medical Research, he contributed to the health of the nation as President of the Maryland Board of Health, as Director of the School of Hygiene at the Hopkins, as President of the National Tuberculosis Association, and as President of the National Committee for Health Hygiene. He served in World War I as adviser to the Surgeon General. He was chairman of the International Commission which met after the war at Cannes to create an International League of Health. His final efforts were made as Director of the Institute of Medical History at the Johns Hopkins.

Those admirers of Dr. Welch who expect to find in this biography a philosophical estimate, and those sentimentalists who desire the sort of hero worship which in our opinion too often spoils otherwise good biographical material, will be disappointed . This is a straightforward factual account of a man of action who kept his own counsel, had few intimates after a misunderstanding with his best friend, shunned religious conformity after early efforts to defend a fundamentalism were supplanted by European humanism, who had difficulty deciding on a career but in the end could claim first rank among American contributors to medicine. The book is written by members of a very intellectual family whose education and mental endowments were in many instances equal to Dr. Welch's own, and they are more interested in telling what he did than in telling what it meant.

Welch's foibles, his lack of order, absent mindedness, procrastination, self-indulgence, and personal lawlessness, form an almost comic backdrop to the magnificent endowments of heart and mind that set him on a pinnacle. His conversational ability, his gift as a clubman to attract and hold all types of men by his charming personality, his power as a public speaker, his ability to sell his ideas in markets that brought the highest price to the cause for which he pled, his European experience, his very appearance, all contributed to make the Welch who has become almost a legendary figure though dead such a short time. That he was offered the Presidency of Johns Hopkins University, that it was urged upon him for more than a year and that he continued to refuse it, is an interesting commentary upon the man who came to his eightieth birthday showered with many honors, decorations and medals and no less than eighteen honorary degrees.

If one should attempt to find the contribution of Welch to the Hopkins and to American medicine one would not find it chiefly in the fields of pathology and bacteriology which claimed the best of his earlier years though in both he made commendable contributions. Nor would one find it in the domain of public health or of medical history, though in both he was a pioneer and organizer. One would find it in his medical statesmanship. He was a man whose imagination and field of activity embraced vast expanses of virgin territory. He conceived of development, progress and accomplishment on a scale beyond the comprehension of the average man in a similar position. He brought Europe to America at a time when Europe had much to give America.

The reader who did not know Dr. Welch in the flesh will be left wondering by this biography why he was called "Popsy". Perhaps he looked the part, but such terms of endearment would seem to call for

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a more intimate contact between student and teacher than apparently existed between Dr. Welch and the young men of John Hopkins. Except during the early years of his professional life his contacts with students were not frequent, familiar or fatherly. Certainly in his later years when this term seems to have come into general use, he was too busy with matters of transcendent importance to give more than fleeting attention to his professorial duties. "Popsy" was an appellation more frequently on the lips of older associates and practicing physicians who were his admirers than on the lips of students. This book produces no evidence to show that Dr. Welch was the same sort of idol for the young undergraduates that his confrere, Dr. Osler in the chair of medicine, proved to be. Nevertheless he is as much a part of America's great medical tradition.

Progress

IT NOW looks as though Virginia may get her medical examiners within a reasonable length of time. The Norfolk County Medical Society gave the necessary impetus to the movement. The Medical Society of Virginia acted favorably upon the suggestion of its component society. The legislative committee was promptly instructed to take the necessary steps to put the Society's wish into operation. Dr. Dean Cole, the vigorous and far-sighted chairman of this committee, is now actively at work, and results are expected.

Your Country Calls

WAR! Registration of all men up to sixty-five years of age, and for service registration of those up to forty-five years is now provided for by law. The Procurement and Assignment Service for Physicians, Dentists, and Veterinarians, established by Executive Order on October 30, met with the committees on preparedness of the medical, dental, and veterinarian professions in Chicago on December 18, and planned the immediate enrollment of additional doctors in the Armed Forces of the United States. To facilitate the creation of an enlarged pool upon which to call, all who are ready to serve the nation should now fill out the accompanying blank and mail it at once to Dr. Sam F. Seeley. Estimates indicate that sixty thousand physicians are available for service.

Societies

The Southampton County Medical Society

Held its fall meeting on October 29th at Franklin. The following scientific program was presented: Urinary Tract Infections by Dr. Leroy Smith; Practical Points in Allergy by Dr. H. Charles Ballou; Otitis Media in Children by Dr. Morgan B. Raiford; Recent Advances in Medicine by Dr. R. L. Raiford; and a motion picture "Otoscopy in the Inflammations".

Attending physicians were dinner guests of the Raiford Hospital Staff, at which time Dr. B. A. Pope was honored with the following remarks, in commemoration of his forty-five years of medicine in Southampton County:

> "Dr. B. A. Pope, a native of Newsoms, returned to his home community after graduating from the Medical College of Virginia. During his years of medical service in his community he has reared and educated his family, instilling in his children his ideals of Christian living and leadership that he has followed throughout his life. In carrying on his medical activities, he has quietly gone about his work as an example of conscientious and unselfish service to all alike. He has answered countless calls for aid in which he knew that his returns would be only the appreciation of his kind and benevolent service rendered. We, the physicians of Southampton County, extend our best wishes to Dr. Pope and trust that he may have as many more anniversaries. We are unable fully to express our gratitude for having him as our neighbor, friend and fellow practitioner."

Williamsburg-James City County Medical Society.

At the last meeting of this Society, the following officers were elected for the coming year: President, Dr. A. M. Sneed of Toano; vice-president, Dr. E. T. Terrell, Jr., of Williamsburg; and secretary-treasurer, Dr. I. S. Zfass (re-elected), Williamsburg.

The retiring president, Dr. T. B. Henderson, presented each member of the Society with an attractively framed copy of the famous prayer of Moses Maimonides, the noted Hebrew philosopher and physician, who lived in Spain from 1135 to 1204.

The Society meets monthly on the second Friday, with the exception of July and August. For the past several months, the guest speakers have been Dr. J. Warren Sayre of Newport News who spoke on "Office Gynecology"; Dr. E. T. Gatewood of Richmond, whose subject was "Use of the Sulfonamides in Ear, Nose, and Throat Diseases"; and Dr. Frank N. Pole of Richmond who spoke on the "Management of Stone in the Ureter".

I. S. ZFASS, *Secretary-Treasurer.*

Lynchburg Academy of Medicine.

The regular meeting of the Academy was held December 1, at the Lynchburg General Hospital, with the president, Dr. Powell Dillard, presiding.

This was the annual business meeting with reports of the committees. The Academy again authorized $100.00 to be spent in the library.

Dr. John Hundley, Jr., automatically succeeded to the presidency, and the following were elected: Dr. S. H. Rosenthal, president-elect; Dr. Porter Echols, vice-president; and Dr. B. H. Kyle and Dr. J. W. Devine, Sr., to Board of Trustees for three years. The secretary will be chosen by the trustees at the January meeting.

A sound effect, color chrome movie, showing Vitamin B Deficiencies, was enjoyed by the members and numerous visitors who came in after the business session.

C. E. KEEFER, *Secretary-Treasurer.*

Richmond Academy of Medicine.

The annual meeting of the Academy was held on December the 9th, with Dr. W. B. Porter presiding. Reports were presented from the various committees and the election of officers was held. Dr. Beverley R. Tucker will succeed to the presidency at the first January meeting. Others serving with Dr. Tucker will be Dr. Arthur S. Brinkley, president-elect; Drs. Emmett H. Terrell and A. E. Turman as vice-presidents; and Dr. G. R. Maloney and William R. Jordan as new members of the board of trustees.

The usual Christmas dinner followed the meeting.

Roanoke Academy of Medicine.

The December meeting of the Academy was held on the 1st of the month at Hotel Roanoke and was in the form of a dinner meeting. Following the dinner, there were two guest speakers—Dr. Fletcher D. Woodward of Charlottesville, who spoke on "The Results of Treatment of Malignant Tumors of the Larynx, Hypopharynx, Nasopharynx and Sinuses", showing movies of his laryngectomy operation; and the other guest was Dr. W. Lowndes Peple of Richmond, whose subject was "The Results of Radium Treatment of Cancer of the Cervix".

Dr. Mortimer H. Williams is president and Dr. H. B. Stone, Jr., secretary of the Academy.

The Medical Society of Northern Virginia

Met at Front Royal on December the 9th, with Dr. J. B. McKee of Winchester, presiding. Dr. Dean Cole of Richmond, invited guest, spoke on "Pneumonia". Other speakers at this meeting were: Drs. O. W. Carper and L. K. Woodward of Front Royal, and Leslie N. Bell and J. B. McKee of Winchester. Dr. J. E. Harris of Winchester is secretary.

The Fourth District and Southside Virginia Medical Association

Held its regular meeting in Petersburg on December the 30th, with a good attendance. The meeting opened with a social hour at 2:30 p.m., and, after the business and scientific session, the members had dinner at Hotel Petersburg. Speakers on the scientific program were: Dr. W. Ambrose McGee, Richmond, whose subject was "Fetal Hiccoughs"; Dr. David C. Wilson, University, "The Early Diagnosis of Mental Disease"; Dr. A. M. Showalter, Christiansburg, "Professional Collaboration from a Medical Standpoint"; Dr. Wright Clarkson, Petersburg, "New Methods of Diagnosis and Treatment of Cancer of the Uterus"; Dr. F. B. Mandeville, Richmond, "Points About the Roentgen Examination of Brain Tumors That Every Physician Should Know"; Dr. Thomas Murrell, Richmond, "The Many Sided Problems of Acne"; and Lt. Col. Ernest T. Trice, M.C., Richmond, "The Physician's Responsibility in Local and National Defense".

Petersburg Medical Faculty.

At the annual meeting in November, Dr. J. Bolling Jones was elected president to succeed Dr. L. S. Early. Other officers are: vice-presidents, Drs. Fletcher J. Wright, Jr., and Henry M. Snead; secretary-treasurer, Dr. Wilbur M. Bowman (re-elected). The court medicale will be composed of the new president and the four immediate past presidents—Drs. L. S. Early, J. E. Hamner, H. M. Snead and Leta J. White.

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The South Piedmont Medical Society

Held its semi-annual meeting in South Boston, on the afternoon of November the 19th, with Dr. E. E. Barksdale, president, of Danville, presiding. The program included the following papers: Our Lesson from Nature on the Control and Arrest of Pulmonary Tuberculosis by Dr. S. E. Hughes, Danville; Sulfanilylguanidine in Bacillary Dysentery—a Review of the Literature with Case Report by Dr. Ray A. Moore, Hampden-Sidney; A Report of 2,000 Cases of Blood Examination for Syphilis by Dr. H. J. Langston and Miss Evelyn Byrd, Danville; Obesity—Cause, Disability from, and Treatment—a Review by Dr. John Hundley, Jr., Lynchburg; and a Symposium on Orthopedics by Dr. Prentice Kinser of Danville on Treatment of Fractures of the Os Calcis, Dr. H. R. Bourne of Danville on Treatment of Fractures of the Skull, and Dr. C. E. Keefer of Lynchburg on Treatment of Fractures of the Femur. The discussion on the symposium was opened by Dr. R. V. Funsten, guest, from the University of Virginia.

Following refreshments at the home of Dr. W. C. Brann, and a banquet, Dr. R. A. Ross, guest from Durham, N. C., spoke on the Management of Prolonged Labor.

Dr. F. O. Plunkett of Lynchburg is secretary of the Society.

News

Dates Selected for the State Meeting.

The Roanoke Academy of Medicine has appointed Dr. W. L. Powell of that city as chairman of the Local Committee of Arrangements for the 1942 meeting of the Medical Society of Virginia to be held in Roanoke. Hotel Roanoke has been chosen as headquarters and the Council has selected October 5, 6 and 7 as dates for this meeting.

The Seaboard Medical Association of Virginia and North Carolina.

Held its forty-sixth annual meeting at Virginia Beach, December 2-4, with the president, Dr. Waverly R. Payne of Newport News, presiding. There were over one hundred fifty registered and the meeting was an excellent one. On the opening evening, Governor-elect Darden addressed a public meeting. Wilson, N. C., was chosen for the 1942 place of meeting and the dates selected are December 1, 2 and 3. Officers elected for the new year are: President, Dr. G. Erick Bell, Wilson, N. C.; vice-presidents, Drs. A. A. Burke, Norfolk; Joshua Tayloe, Washington, N. C.; John R. Hamilton, Nassawadox; and Joseph Smith, Greenville, N. C.; and secretary-treasurer, Dr. Clarence Porter Jones (re-elected), Newport News.

Southern Surgical Association.

At the annual meeting of this Association at Pinehurst, N. C., early in December, Dr. Barney Brooks of Vanderbilt University, Nashville, Tenn., was elected president for the ensuing year; Drs. Frank S. Johns of Richmond and Foy Roberson of Durham, vice-presidents; Dr. Alton Ochsner of New Orleans, secretary; and Dr. Charles A. Vance of Lexington, Ky., treasurer, the two last named being re-elected. Dr. Harry H. Kerr of Washington, D. C., retiring president, was named a member of the council, succeeding Dr. Harvey B. Stone of Baltimore, Md. It was decided to hold the 1942 meeting in Savannah, Ga., next December, dates to be announced later.

Married.

Dr. Arnold F. Strauss and Miss Marjorie Ware Spindle, of Norfolk, October 25.

Dr. Joseph Page Pollard, U.S.N., class of '39, University of Virginia Medical School, and Miss Mary Ruth Walker of Burlington, N. C., November 28, at the Naval Air Station, Pensacola, Fla.

Ordered to Army Duty.

Capt. Charles Henry Henderson of Norton and Lt. Herman Frank Oppleman of Richmond have been ordered to extended active duty by the Commanding General of the Third Corps Area. Capt. Henderson is stationed at Fort Belvoir, and Lt. Oppleman at MacDill Field, Fla.

Medical College of Virginia News.

Dr. P. N. Pastore, an alumnus of the class of 1934, will join the staff of the college January 1, 1942, as professor of otolaryngology. Dr. Pastore received his A.B. degree from the University of Richmond before entering medicine. He served two

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years as an interne in the hospitals of the college and has been at the Mayo Clinic since 1936. In 1939 he received the M.S. degree in his specialty from the University of Minnesota. He has served sometime as a staff member of the Mayo Clinic.

The New Jersey Obstetrical Travel Club visited the obstetrical department of the college recently. Dr. H. H. Ware, Jr., associate professor of obstetrics and acting head of the department, acted as host to the visitors. The morning was spent in the hospital division with clinics in the afternoon. The visiting physicians were: Dr. Walter B. Mount, Montclair; Dr. Carl H. Ill., Newark; Dr. Nelson H. Bigelow, South Orange; Dr. Robert A. Mackenzie, Asbury Park; Dr. J. Carlisle Brown, Atlantic City; Dr. Edward G. Waters, Jersey City; Dr. S. A. Cosgrove, Jersey City; Dr. Arthur W. Bingham, East Orange; Dr. Raymond T. Potter, East Orange; Dr. Alfred Meurlin, East Orange; Dr. Everette L. Campbell, New York City, and Dr. Dan Geary, Morristown.

The United States Public Health Service has made a grant of $5,996.19 for the Saint Philip School of Nursing.

Dr. Wortley F. Rudd, dean of the School of Pharmacy, recently returned from an extended Southern trip.

Dr. Harvey B. Haag, professor of pharmacology, addressed the American Pharmaceutical Manufacturers' Association on the subject of *The Role of Pharmacology in the Development of Medicines,* in Washington on December 8.

Miss E. Louise Grant, dean of the School of Nursing, has returned from a four weeks' tour on a travel grant of the nursing schools of the country, including the University of Toronto.

Recent college visitors have been: President Charles E. Lawall and Dean Edward J. Van Liere of West Virginia University; Dr. Maurice B. Visscher, professor of physiology, University of Minnesota; Dr. George H. Whipple, dean of the University of Rochester Medical School; Dr. Harlan Horner, secretary of the American Council on Dental Education; and Dr. H. G. Grant, dean of the School of Medicine, Dalhousie University, with several of his associates.

Dr. C. C. Coleman, professor of neurological surgery; Dr. I. A. Bigger, professor of surgery; Dr. Harry J. Warthen, associate professor of surgery; and Dr. Frank S. Johns, professor of clinical surgery, attended the meeting of the Southern Surgical Association, Pinehurst, North Carolina, on December 9. Dr. Coleman presented a paper on *Treatment of Compound Fractures of the Skull* and Dr. Warthen spoke on *Gas Gangrene.* Dr. Frank Johns was elected vice-president of the Association and Dr. H. Page Mauck, professor of clinical orthopedic surgery, was elected to membership in the Association.

Dr. William B. Porter, professor of medicine, and Dr. I. A. Bigger, professor of surgery, attended the meeting of the Seaboard Medical Association at Virginia Beach. Dr. Porter read Dr. Bernard Kinlaw's paper at the meeting due to Dr. Kinlaw's untimely death.

Dr. Porter P. Vinson, professor of bronchoscopy, attended the annual meeting of the Alumni Association of the Mayo Foundation recently. His presidential address was *Traditions in Medicine.* Dr. Vinson also gave a paper on *Diagnosis and Treatment of Cardiospasm* at the meeting of the Calhoun County Medical Society, Anniston, Alabama, and another at the symposium on gastro-enterology at the University of Virginia on *Diseases of the Esophagus.*

Dr. C. C. Coleman, professor of neurological surgery, attended the meeting of the Seaboard Air Line Railway Surgeons' Association at Jacksonville, Florida, giving a paper on *Prevention of Infection of Acute Head Injuries.*

Alpha Omega Alpha honorary medical society presented Dr. Edward D. Churchill, John Homans professor of surgery, Harvard Medical School, on its annual lectureship. Dr. Churchill spoke on *Some Fundamental Principles Underlying Surgery of the Lungs,* in the Simon Baruch Auditorium. Following the afternoon lecture a banquet for new initiates was held at the Commonwealth Club.

News From University of Virginia, Department of Medicine.

A bequest of $13,432 has been received from Mr. William E. Hopkins, the income from which is to be used for the purchase of medical books and medical journals for the library and medical school.

The Twenty-eighth Postgraduate Clinic Sympo-

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sium on Gastro-Enterology was held at the University of Virginia Hospital on Friday and Saturday, November 14 and 15. Lectures were given by Dr. Porter P. Vinson, professor of bronchoscopy, esophagoscopy and gastroscopy, Medical College of Virginia; Dr. Julian M. Ruffin, associate professor of medicine, Duke University; Dr. Chester M. Jones, clinical professor of medicine, Harvard University; Dr. T. T. Mackie, assistant clinical professor of medicine, College of physicians and Surgeons; Dr. Warren T. Vaughan, director, Vaughan-Graham Clinic, Richmond, Virginia; Dr. William Osler Abbott, associate in medicine, University of Pennsylvania.

Dr. Vincent Archer attended the meeting of the American Roentgen Ray Society at Atlantic City, New Jersey, on November 16. He was the chairman of the Scientific Exhibit Committee and a member of the program committee.

The Eighth Annual Postgraduate Course in Ophthalmology and Otolaryngology was given at the Medical School on the four days, December 2 to 5. Lectures were given by Dr. Frank B. Walsh, associate professor of ophthalmology, Johns Hopkins University; Dr. Derrick Vail, professor of ophthalmology, University of Cincinnati; Dr. Algernon B. Reese, attending surgeon, Institute of Ophthalmology, New York City; Dr. Edward A. Looper, professor if diseases of the nose and throat, University of Maryland; Dr. Eugene Landis, professor of medicine, University of Virginia; Dr. E. P. Lehman, professor of surgery, University of Virginia; Dr. Louis H. Clerf, professor of laryngology and broncho-esophagology, Jefferson Medical College; Dr. Karl M. Houser, professor of otolaryngology, University of Pennsylvania; Dr. H. B. Mulholland, professor of practice of medicine, University of Virginia; Dr. J. Edwin Wood, professor of practice of medicine; Dr. W. H. Pearson, orthodontist to the University of Virginia Hospital.

On November 25, Dr. Hugh Hampton Young, director of the Brady Urological Clinic, Johns Hopkins University Hospital, delivered an address before the Pi Mu Chapter of Phi Chi. He spoke on "The Problems in Prostatic Surgery" and "Some Hermaphrodites I Have Met and Operations Carried Out to Make Them Happy".

Dr. Edwin P. Lehman presented a paper before the meeting of the Southern Surgical Association in Pinehurst, North Carolina, on December 9-11, on the subject "Annular Pancreas As a Clinical Problem".

Congress on Industrial Health.

Industrial health is of greater interest to the people of this country now than at any time in its history, because of the vast amount of defense work which is being done. For this reason, the fourth annual Congress on Industrial Health, to be held in Chicago, January 12 and 13, should prove most timely and interesting. This is being sponsored by the American Medical Association and the meetings, which will be held at the Palmer House, will be open to physicians and others interested in industrial health, and there will be no registration fee.

Program for the meeting appeared in *The Journal of the American Medical Association* for December the 6th.

Dr. S. H. Rivers,

For sometime located at Calvin, has obtained a leave of absence for a year to look after industrial work for the Clinchfield Coal Corporation at Dante.

Laboratory Evaluation Study for Serology.

An evaluation study of serodiagnostic tests for syphilis for the approval of laboratories performing such tests in compliance with the requirements of the premarital examination law will be conducted sometime during the month of January. This study is being made again in compliance with Section (d) of the Premarital Examination Law which became effective August 1, 1940, and is as follows:

"Serological tests required by this section shall be made by the State Department of Health or by a laboratory approved for such purpose by the State Health Commissioner; serological tests used shall be such as are approved by the State Health Commissioner."

All laboratories operated privately by physicians, technician serologists, hospitals, city and county health departments are invited to participate in this study. Those laboratories desiring approval should communicate with the State Department of Health. The exact date, instructions, and other information pertaining to the evaluation study will be sent to all city, county, private, and semi-private laboratories wishing to participate in the study.

Dr. M. H. Mund,

Of Martinsville, is now in St. Louis where he is taking postgraduate work in diseases of the ear, nose and throat.

Dr. V. E. Lascara,

Who practiced for a time in Norfolk, later joining the Medical Corps of the Army, has been released from active duty and has joined the staff of the Central State Hospital at Petersburg.

1942 Essay Contest.

The Mississippi Valley Medical Society offers annually a cash prize of $100.00, a gold medal, and a certificate of award for the best unpublished essay on any subject of general medical interest (including medical economics) and practical value to the general practitioner of medicine. Contestants must be members of the American Medical Association who are residents of the United States. The winner will be invited to present his contribution before the next annual meeting of the Mississippi Valley Medical Society at Quincy, Ill., September 30, October 1, 2, 1942, the Society reserving the exclusive right to first publish the essay in its official publication—the *Mississippi Valley Medical Journal* (incorporating the *Radiologic Review*). All contributions shall not exceed 5,000 words, be typewritten in English in manuscript form, submitted in five copies and must be received not later than May 1, 1942. Further details may be secured from Harold Swanberg, M. D., Secretary, Mississippi Valley Medical Society, 209-224 W. C. U. Building, Quincy, Illinois.

Another Service for Dr. Riggin.

Governor Price has appointed Dr. I. C. Riggin, State Health Commissioner, as chief of Emergency Medical Services, with authority to organize Virginia communities against possible bombings and other disasters, dealing generally with the medical phases. Dr. Riggin designated Dr. William Grossmann, director of the Bureau of Communicable Diseases, as liaison officer to contact the various communities and he at once started upon this work.

National Social Hygiene Day

Will be observed throughout the country on February the 4th by meetings, radio broadcasts, and special publicity in newspapers and periodicals, as part of the fight against syphilis and gonorrhea and conditions favoring their spread. This year's theme is "Keep America Strong, Help Build Better Health". The American Social Hygiene Association, 1790 Broadway, New York, will be glad to assist local communities in the preparation of programs for the day.

Dr. Hugh C. Henry,

Richmond, has been appointed as a member of a committee which will prepare a history of American psychiatry for the American Psychiatric Association. It is hoped to complete the document by the centennial meeting of the Association in Philadelphia in 1944.

Dr. A. Wilson Brown,

First full-time venereal disease control officer for Richmond, recently resigned his position in this city to locate in Pocahontas.

Loss by Fire.

In a large fire at Mathews, the last of November, Drs. John R. Gill and N. D. Nelms were among those to suffer the loss of their offices.

Dr. John T. R. Sweeney,

Richmond, has been elected chairman of the City Democratic Committee for two years, succeeding Colonel Robert T. Barton, Jr., resigned.

Dr. Maxwell Edward Lapham,

Dean of the School of Medicine of Tulane University, has reported for active duty as a lieutenant commander in the United States Naval Reserve, to serve as assistant to the medical officer of the Eighth Naval District.

Dr. Lapham has many friends in this State who will be interested in hearing of him. He gave courses of instruction in obstetrics for over two years to practicing physicians in Virginia under auspices of the State Society, the University of Virginia and the Medical College of Virginia, later giving a similar course in obstetrics to physicians in Mississippi, after which he located in New Orleans.

Doctors Wanted—

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Obituaries

Dr. Greer Baughman,

Long prominent as a physician and citizen in Richmond, died December 2nd, after an illness of several weeks. He was born in this city in February, 1874, and studied medicine at the Medical College of Virginia, graduating in the class of '97. Following this, he studied abroad and, upon his return became associated with the teaching staff of his alma mater where he had been professor of obstetrics since 1915. During the World War, he was attached to Base Hospital No. 45, with the rank of captain. He was a past president of the Richmond Academy of Medicine, a former vice-president and chairman of an important committee in the Medical Society of Virginia, one of the founders of Stuart Circle Hospital, this city, and identified with numerous medical and social organizations. He was also a former president of the Community Recreational Association and always took an active part in this civic work. He is survived by his wife and three children.

Dr. Sidney Lockhart Scott,

Prominent Fredericksburg physician, died suddenly at his home on December the 16th, of a heart attack. His health had not been good for several years, though he had kept up his work as far as possible. Dr. Scott was sixty-two years of age and had graduated in medicine from the University of Virginia in 1901. He served for a short time as lieutenant in the U. S. Navy, after which he took up private practice in Fredericksburg. He was interested in many civic affairs, being among the early advocates for establishing the National Battlefield Park there, and was an ex-president of that association as also of the local Chamber of Commerce. He was, too, a charter member and former president of the Kiwanis Club and a member of the Elks Lodge. Two children survive him.

Dr. John W. Bolen

Of Galax, for many years a member of the Medical Society of Virginia, died on November the 2nd, of coronary sclerosis. He was eighty-one years of age, and graduated from the Medical College of Virginia in 1885.

Dr. Vernon Leslie Litsinger,

Farnham, died on October the 14th of heart disease. He was fifty-eight years of age and a graduate of the Maryland Medical College, Baltimore, in 1912. He was an active member of the Northern Neck Medical Society and for a time was a member of the Medical Society of Virginia.

Dr. Don Creed Wills,

For many years a well known physician of Nelson County, died November the 23rd at his home at Arrington, at the age of sixty-eight. He graduated from the Medical College of Virginia in 1918 and was for a time a member of the Medical Society of Virginia. His wife and a daughter survive him.

Dr. Charles Joseph Sager,

Woodstock, died of cerebral hemorrhage on October the 24th. He was sixty-eight years of age and a graduate of the Medical College of Virginia in 1898.

Dr. Herman Henry Moore,

Retired physician of Markham, died October the 20th, at the age of sixty-one years. He was a graduate in medicine from the University of Toronto, Toronto, Canada, in 1908, and from the Detroit College of Medicine in 1909.

Dr. Casper Walker Jennings,

Well known eye, ear, nose and throat specialist of Greensboro, N. C., died at his home in that city on November the 22nd. He was forty-eight years of age and graduated from the Medical College of Virginia in 1916. He is survived by his wife and three children.

Dr. George Fordham,

Powellton, W. Va., died October the 4th, at the age of sixty-three, death being due to coronary occlusion. He graduated in medicine from the University of Virginia in 1907 and had taken an active part in medical affairs in his community, being a past president of his county medical society. He was also a veteran of the Spanish American and World Wars.

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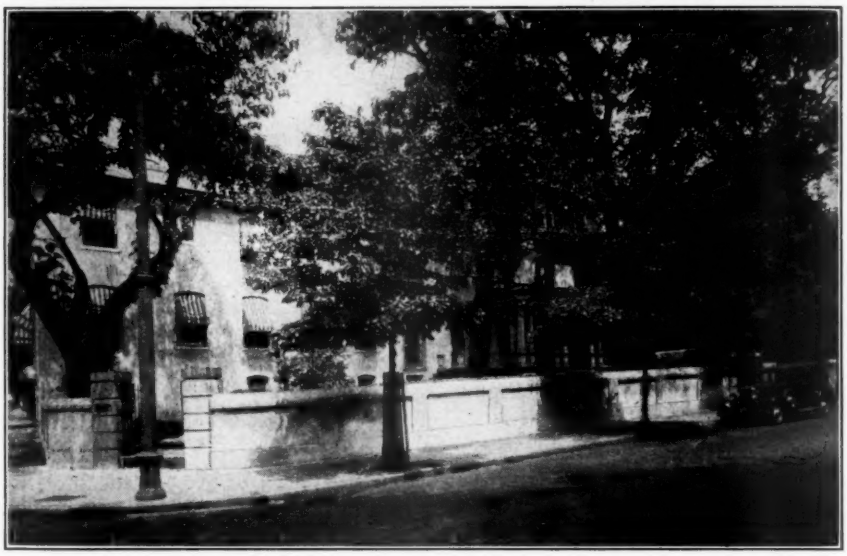

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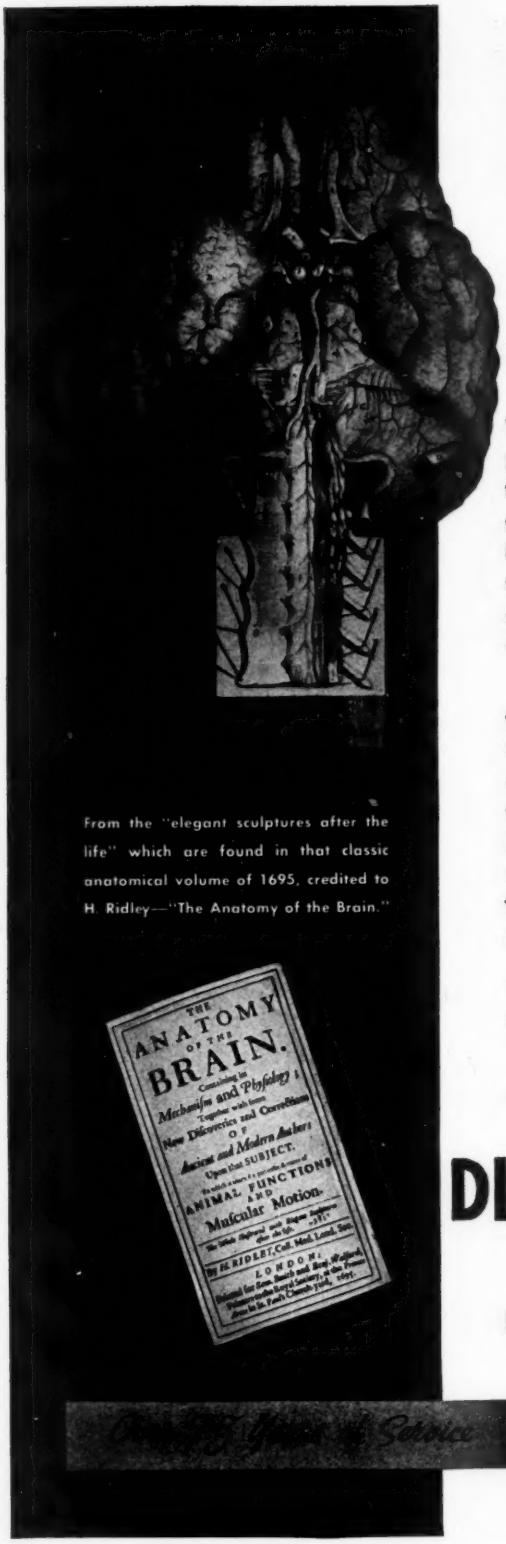

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1. Council Report: J.A.M.A., 113: 1734, 1939
2. Merritt, H. H. & Putnam, T. J.: A. J. Psychiat., 96: 1023, 1940

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Bruckner, Die Biochemie des Tabaks, 1936
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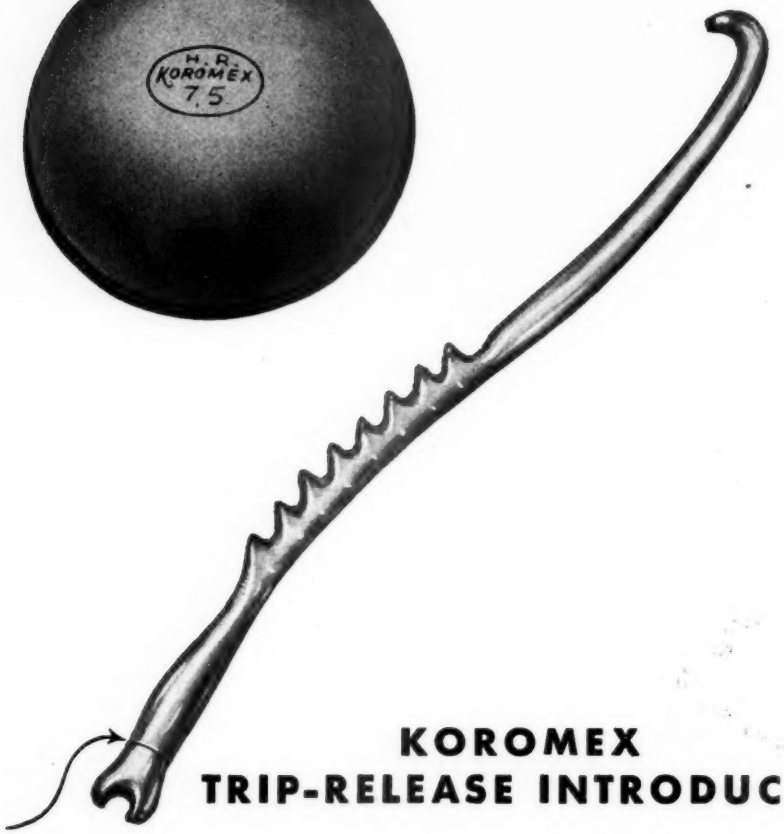

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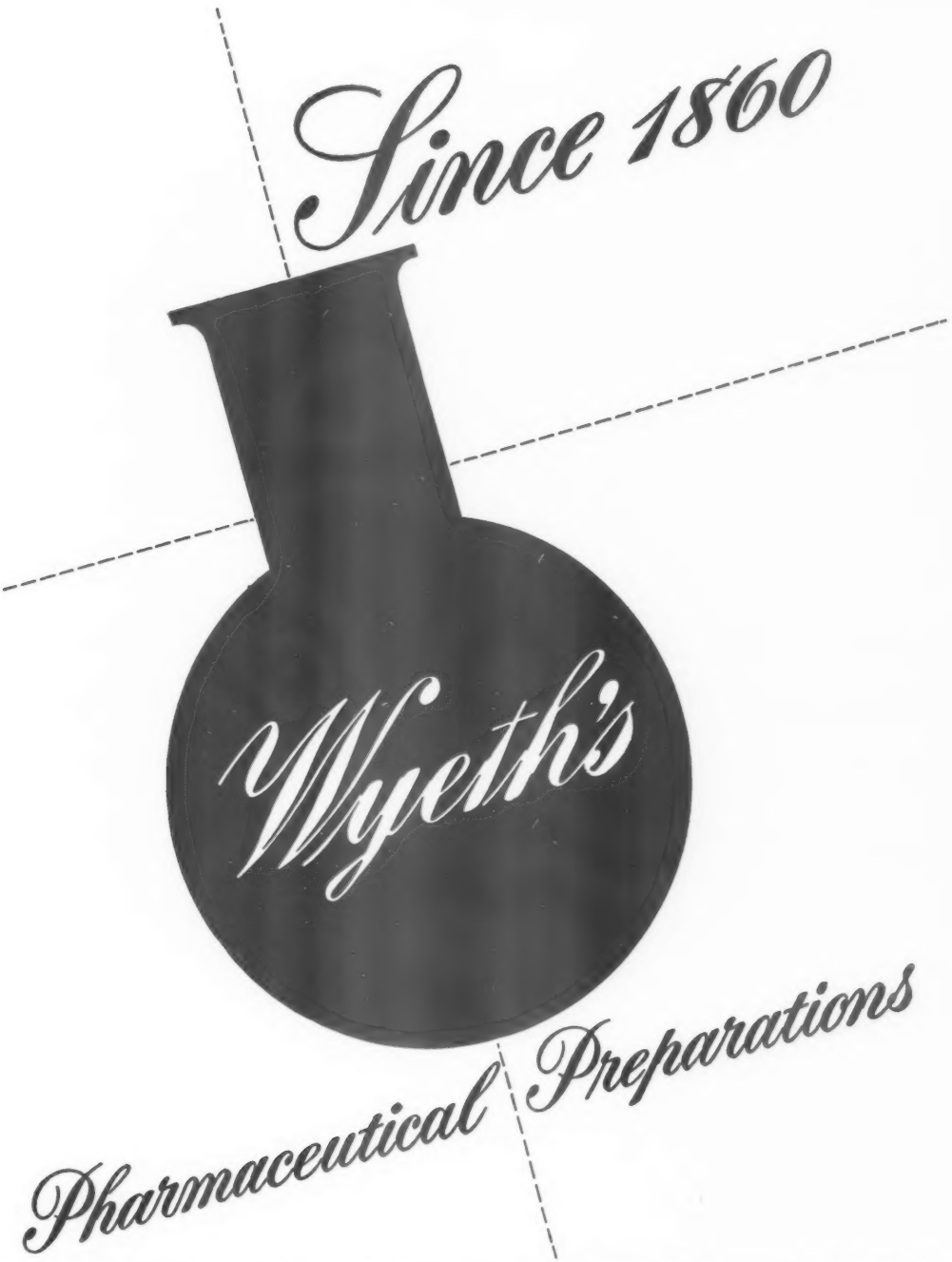

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